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.REM &

                        IDENTIFICATION
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PRODUCT CODE:   AC-T263B-MC

PRODUCT NAME:   CZTUVB0 TU80 DATA RELIABILITY TEST

PRODUCT DATE:   11 - JULY - 1983

MAINTAINER:     TAPE DIAGNOSTIC ENGINEERING

AUTHOR:         ROBERT F. WERY/JACK RICHARDSON/TERRENCE REILLY
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GLOSSARY

ACT	AUTOMATED COMPUTER TEST SYSTEM
APT	AUTOMATED PRODUCT TEST SYSTEM
BYTE/RECORD/FILE COUNT BRF	IS STORED IN THE 4TH WORD OF THE COMMAND PACKET AND IT'S USE BY THE TU80 DEPENDS ON THE TYPE OF COMMAND.
CMD	TU80 COMMAND (SEE 2.3.14.1 FOR LIST OF COMMANDS)
COMMAND PACKET CMDPKT	FOUR WORD PACKET IN THE CPU MEMORY WHICH CONTAINS ALL INFORMATION NEEDED BY THE TU80 TO EXECUTE A COMMAND.
EXTENDED STATUS	FOUR WORDS OF TU80 STATUS WHICH ARE TRANSFERRED AS PART OF THE MESSAGE PACKET AT THE COMPLETION OF A COMMAND.
MESSAGE PACKET	SEVEN WORD PACKET IN THE CPU MEMORY INTO WHICH THE TU80 STORES STATUS AT THE COMPLETION OF A COMMAND.
PC	PROGRAM COUNTER
PSW	PROCESSOR STATUS WORD
RESIDUAL FRAME COUNT RFC	THIS COUNT IS PART OF THE MESSAGE PACKET AND CONTAINS THE NUMBER OF BYTES/RECORDS /FILES REMAINING TO BE PROCESSED AT THE COMPLETION OF A COMMAND.
SPECIAL CONDITION SPEC COND	TSS4 BIT15. WHEN SET, INDICATES THAT THE LAST COMMAND DID NOT COMPLETE WITH-OUT INCIDENT.
TERMINATION CLASS CODE TCC	THREE BIT CODE IN THE TSSR WHICH INDI-CATES THE TYPE OF COMMAND TERMINATION.
TSBA	TAPE SYSTEM BUS ADDRESS REGISTER.
TSDB	TAPE SYSTEM DATA BUFFER REGISTER.
TSSR	TAPE SYSTEM STATUS REGISTER.
XST0	EXTENDED STATUS REGISTER 0
XST1	EXTENDED STATUS REGISTER 1
XST2	EXTENDED STATUS REGISTER 2
XST3	EXTENDED STATUS REGISTER 3
XXDP+	XXDP+ IS A "CATCH-ALL" NAME FOR A GROUP OF PDP-1 DIAGNOSTIC PACKAGES AVAILABLE ON MULTIMEDIA.

1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

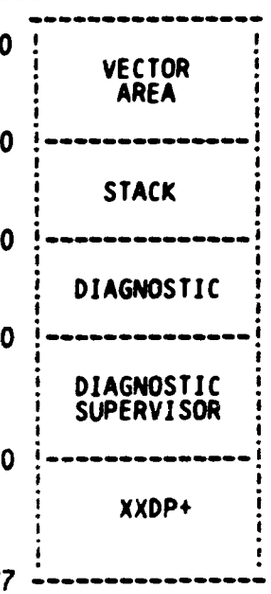
1.1.1 FUNCTIONAL DESCRIPTION

THIS PROGRAM CAN BE USED AS A BASIC FUNCTION TEST, A DATA RELIABILITY TEST, A COMPATABILITY TEST, OR TO EXECUTE A SEQUENCE OF OPERATOR SELECTED COMMANDS.

1.1.2 STRUCTURE OF PROGRAM

THIS DIAGNOSTIC IS A SINGLE PROGRAM FROM THE STANDPOINT OF THE DIAGNOSTIC USER, BUT IT CONTAINS A CONTROL MODULE RELEASED INDEPENDENTLY AS A DIAGNOSTIC SUPERVISOR.

1.1.3 MEMORY MAP



FREE MEMO SPACE FOR WR/RD BFRS OR OTHER PUROSES IS ALLOCATED BY THE SUPERVISOR ON REQUEST OR CHOOSEN BY PROGRAMMER TO RESIDE BETWEEN THE DIAG AND THE SUPERVISOR.

1.1.4 DIAGNOSTIC INFORMATION

1.1.4.1 SCOPE

THIS DIAGNOSTIC CAN TEST UP TO 4 UNITS SIMULTANEOUSLY. THE 4 UNITS ARE ASSIGNED LOGICAL UNIT NUMBERS 0 - 3 BY THE DIAGNOSTIC.

THERE ARE 6 TESTS IN THIS PROGRAM:

- TEST 1 - BASIC FUNCTIONS.
- TEST 2 - DATA RELIABILITY.
- TEST 3 - WRITE AND READ STREAMING TEST.
- TEST 4 - WRITE COMPATABILITY/WRITE UTILITY.
- TEST 5 - READ COMPATABILITY/READ UTILITY.
- TEST 6 - OPERATOR SELECTED SEQUENCE UTILITY.

1.1.4.2 ERROR RECOVERY

ERROR RECOVERY IS PERFORMED ON READ, WRITE AND WRITE TAPE MARK ERRORS UNLESS RECOVERY IS INHIBITED BY THE OPERATOR.
THE READ FORWARD/READ REVERSE RETRY LIMIT IS 16 (8 IN THE SAME DIRECTION AND 8 IN THE OPPOSITE DIRECTION). FOR MORE INFORMATION ON ERROR RECOVER PROCEDURES, SEE SECTION 3.0 (ERROR REPORTING).

1.1.4.3 WRITE ERROR RECOVERY

THERE ARE 2 DISTINCT, SELECTABLE WRITE-ERROR-RECOVERY ALGORITHMS:

1. MEDIA/OPERATIONAL SELECTIVE ALGORITHM
2. OPERATIONAL ALGORITHM

BY DEFAULT THE DIAGNOSTIC SELECTS THE FIRST ALGORITHM TO DISCERN MEDIA RELATED WRITE ERRORS FROM OPERATIONAL ONES.

TO SELECT THE SECOND ALGORITHM:

ANSWER 'Y' TO	CHANGE SW (L) ?
ANSWER 'N' TO	BAD TAPE SPOT DETECTION (L) Y ?

WHEN ERROR RECOVERY IS INHIBITED, THE LATTER QUESTION IS NOT ASKED AND BOTH ALGORITHMS ARE BYPASSED.

1.1.4.3.1 MEDIA/OPERATIONAL SELECTIVE WRITE-ERROR-RECOVERY ALGORITHM

SCOPE

THE ALGORITHM DISCERNS MEDIA RELATED WRITE ERRORS FROM OPERATIONAL ONES.

ALGORITHM

A WRITE RETRY SUBROUTINE IS CALLED BY THE RECOVERABLE ERROR SUBROUTINE ENTERED UPON DETECTIION OF A WRITE RECOVERABLE ERROR.
THE WRITE RETRY SUBROUTINE REWRITES RECORD IN SAME SPOT ON TAPE:
REPEAT 4 TIMES.
IF ALL 4 REPEATS ARE GOOD, RECORD IS CONSIDERED AS RECOVERED AND A RECOVERABLE WRITE ERROR IS LOGGED AT THAT RECORD NUMBER.

```
                        IF ANY OF THE 4 REPEAT FAILS, ERASE BAD RECORD, LOG SUSPECTED
                        BAD SPOT AT THAT RECORD NUMBER, RETRY AGAIN 3 INCHES FURTHER DOWN TAPE.
                        RETRY 4 TIMES, UP TO 4 REPEATS EACH.
                        IF RECORD CANNOT BE WRITTEN WITHOUT RECOVERABLE ERROR  AFTER 4 RETRIES,
                        ERASE RECORD, REPORT RETRY FAILED ON BAD SPOT.
                        THE RECOVERABLE ERROR SUBROUTINE THEN CONTINUES TO CALL THE WRITE
                        RETRY SUBROUTINE, WHICH REISSUES THE GROUP OF 4 RETRIES,
                        UNTIL THE RECORD IS RECOVERED OR 20 BAD SPOTS HAVE BEEN  LOGGED .

                        TWENTY (20) BAD SPOTS MAXIMUM ARE ALLOWED PER TAPE PASS.
                        WHEN 20 BAD SPOTS HAVE BEEN LOGGED, ON SAME RECORD NUMBER OR NOT,
                        TAPE IS CONSIDERED DEFECTIVE:  A BAD TAPE OVERFLOW MESSAGE IS PRINTED
                        AND UNIT IS REWOUND, THEN DROPPED.

                        DURING THE RECOVERY PROCESS, IT IS NECESSARY TO PERFORM SEVERAL TAPE
                        POSITION OPERATIONS: SPACE REVERSE, ERASE.  IF A POSITION ERROR STATUS
                        IS DETECTED DURING THOSE OPERATIONS, THEN THE RECOVERY ATTEMPT IS ABORTE
                        AN APPROPRIATE UNRECOVERABLE MESSAGE IS PRINTED AND UNIT IS DROPPED.

                        ALL BADLY WRITTEN RECORDS FLAGGED WITH RECOVERABLE ERRORS ARE ERASED
                        UNTIL RECOVERED, INCLUDING THE RECORD AT THE 20TH BAD SPOT,
                        SO THAT ALL RECORDS LEFT ON TAPE ARE GOOD WRITTEN RECORDS.
                        BAD SPOTS ARE ERASED, WITH ERASE GAPS FROM 3 TO 12 INCHES  PER RETRY GRO
                        UP TO 20 FEET OF ERASE GAP COULD RESULT WHEN RETRYING TO RECOVER
                        A SINGLE RECORD,IF NO BAD SPOT WERE PREVIOUSLY DETECTED.
                        THAT LONG STRETCH OF  BAD TAPE WOULD THEN BE FLAGGED WITH 20
                        BAD SPOTS AT SAME RECORD NUMBER AND THE TAPE CONSIDERED DEFECTIVE.

                        BAD SPOTS REPORTS

                        IF THE PRINT OF RECOVERABLE ERRORS IS ENABLED, THE BAD SPOTS ON TAPE ARE
                        IDENTIFIED AS THEY ARE DETECTED.  SINCE THE BAD RECORDS ARE ERASED UNTIL
                        THE BAD SPOTS ACTUALLY PRECEDES THE RECORD NUMBER THAT IDENTIFIES THEM.
                        THE NUMBER OF REPEATS AND RETRIES ATTEMPTED IS PRINTED, FROM WHICH THE
                        LENGTH OF ERASE GAPS CAN BE DETERMINED:  APPROXIMATELY 3 INCHES PER RETR

                        THE STATISTICAL REPORT PRINTED AT THE END OF TEST 2 OR UPON A "PRINT" RE
                        CONTAINS A SUMMARY OF THE BAD SPOTS LOGGED ON THE CURRENT TAPE PASS.
                        IN THAT REPORT, ALL COUNTS ARE CUMULATIVE FROM PASS TO PASS, EXCEPT FOR
                        THE NUMBER OF BAD SPOTS: IT RELATES TO A "TAPE PASS" ONLY.
                        FOR THIS PURPOSE, A "TAPE PASS" IS A WRITE PASS FROM BOT TO EOT, OR FROM
                        BOT TO WHERE THE DIAGNOSTIC IS HALTED BEFORE REACHING EOT.
                        A PASS IS DEFINED BY THE SUPERVISOR AS A RUN THROUGH ALL THE TESTS REQUE
                        ON ALL UNITS SELECTED. THOSE PASSES ARE IDENTIFIED AS "PASS" AND "EOP".

                        THE NUMBER OF WRITE RETRIES, CUMULATIVE FROM PASS TO PASS, IS A GLOBAL
                        COUNT OF HOW MANY TIMES THE GROUP OF 4 RETRIES HAS BEEN CALLED.

                        THE NUMBER OF WRITE RECOVERABLE ERRORS EXCLUDES BAD TAPE SPOTS
                        AND REFLECTS THE SPECIFICATIONS OF THE HARDWARE UNDER TEST.
                        PER TAPE PASS, THE NUMBER OF WRITE RETRIES EQUALS THE SUM OF THE
                        NUMBER OF RECOVERABLE WRITE ERRORS AND BAD SPOTS, MOST OF THE TIME.

                        TO CLEAR CUMULATIVE COUNTS, ANSWER 'Y' TO:   CLEAR COUNTERS (L) Y ?.
                        BAD TAPE SPOTS COUNT IS CLEARED WHEN WRITING FROM BOT.
```

```
                                IF TEST 2 IS HALTED, THEN RESTARTED OR CONTINUED, THE RECORD COUNT
                                IS RESET TO ZERO AND THE BAD SPOT ID SHALL FOLLOW THAT  RESET COUNT.

                                SINCE ALL WRITTEN RECORDS ARE KNOWN GOOD, THE READ ERRORS CAN
                                BE ATTRIBUTED TO TRANSIENT NOISE, TRANSIENT ELECTRICAL MALFUNCTIONS,
                                OR CONTAMINANTS ON TAPE AS OPPOSED TO TAPE DEFECTS.

                                THE SAME RECORDS MUST BE WRITTEN FORM TAPE PASS TO TAPE PASS
                                FOR THE BAD SPOTS ID TO REMAIN CONSISTENT IN THOSE TAPE PASSES.

                                EXAMPLE OF A TAPE PASS PRINTS:
                                CZTUV SFT ERR  00009 ON UNIT 00 TST 002 SUB 000 PC: 012100
                                RECOVERABLE ERROR
                                WRT CMD FAILED - UNIT 0   PASS:    1   RECORD:    6
                                PREVIOUS CMD WAS  WRT
                                CMDPKT   TSBA    RFC     TSSR   TCC
                                100205  002406  000000  100210  4
                                026600
                                000000
                                003107
                                XST0    XST1    XST2    XST3
                                000350  000002  100400  000000
                                SUSPECT BAD SPOT AFTER 1 RETRY, 2 REPEAT
                                SUSPECT BAD SPOT AFTER 2 RETRY, 1 REPEAT
                                SUSPECT BAD SPOT AFTER 3 RETRY, 1 REPEAT
                                SUSPECT BAD SPOT AFTER 4 RETRY, 3 REPEAT
                                RETRY FAILED ON BAD SPOT...ERASED!
                                SUSPECT BAD SPOT AFTER 1 RETRY, 1 REPEAT

                                CZTUV SFT ERR  00009 ON UNIT 00 TST 002 SUB 000 PC: 012100
                                RECOVERABLE ERROR
                                WRT CMD FAILED - UNIT 0   PASS:    1   RECORD:10210
                                PREVIOUS CMD WAS  WRT
                                CMDPKT   TSBA    RFC     TSSR   TCC
                                100205  002406  000000  100210  4
                                026600
                                000000
                                004000
                                XST0    XST1    XST2    XST3
                                000350  000002  100010  000000
                                RECOVERED ON RETRY # 1
                                ^C
                                DR>PRI
                                UNIT 0   PASS:    1   RECORD:10210
                                BYTES WRITTEN    0,272,279,691
                                BYTES READ REV   0,301,123,654
                                BYTES READ REV   0,301,120,381
                                                    WRT    RDR    RDF
                                RECOVERABLE ERRORS    1      0      0
                                UNRECOVERABLE ERRORS  0      0      0
                                WRITE RETRIES         3
                                 2 BAD SPOTS THIS TAPE PASS PRECEDING RECORD #:
                                               6      6
                                SPEC COND   HARD   FATAL   COMPARE
                                      2       0       0       0
                                DR>
```

```
                        THIS EXAMPLE SHOWS:
                                RECORD 6 RECOVERED ON 2ND RETRY GROUP
                                THE 2 BAD SPOTS RESIDE IN A 18 INCH ERASE GAP BETWEEN RECORDS 5
                                RECORD 10210 RECOVERED ON 1ST RETRY OF 4 GOOD REPEATS
                                3 WRITE GROUP RETRIES ATTEMPTED, RESULTING IN:
                                        1 RECOVERABLE  WRT ERR FROM RECORD 10210
                                        2 BAD SPOTS BETWEEN RECORDS 5 AND 6



1.1.4.3.2       OPERATIONAL WRITE-ERROR-RECOVERY ALGORITHM

        WHEN THIS ALGORITHM IS SELECTED, THE TU80 WRITE RETRY COMMAND
        IS ISSUED UP TO 16 TIMES OR UNTIL RECORD IS RECOVERED, ON
        A WRITE RECOVERABLE ERROR.  THE WRITE  RETRY COMMAND CONSISTS
        OF A SPACE REVERSE OVER THE BAD RECORD, THEN AN ERASE OF 3 INCHES
        OF TAPE AND REWRITE OF THE RECORD.  THAT COMPOSITE COMMAND
        DOES NOT ALLOW TO DETECT BAD SPOTS ON TAPE.
        THEREFORE NO BAD TAPE SPOTS STATUS IS PRINTED.

        IF RECORD CANNOT BE RECOVERED AFTER 16 WRITE RETRY COMMANDS,
        A RETRY LIMIT EXCEEDED IS FLAGGED AND UNIT IS DROPPED.


1.1.4.4 DIAGNOSTIC TIMING ADJUSTMENT

        A NUMBER OF SUPERVISOR TIMING DELAYS MACROS, KNOWN AS WATCH DOG
        DELAYS, ARE CALLED BY THE DIAGNOSTIC TO WAIT FOR VARIOUS COMMANDS
        COMPLETION.  THESE DELAYS ARE NOT CALIBRATED AND SIMPLY EXPANDS
        INTO AN INLINE NESTED LOOP PAIR.  THE COUNT FOR THE OUTER LOOP
        COMES FROM THE VARIABLE ARGUMENT SUPPLIED BY THE DELAY CALLS.
        THE COUNT FOR THE INNER LOOP COMES FORM THE FIXED "HEADER"
        ELEMENT "L$DLY".
        AS THE DIAGNOSTIC IS RUN ON DIFFERENT CPU'S, THESE DELAYS WILL
        VARY IN LENGTH WITH MEMORY SPEED.

        IF TIME-OUT OCCURS WHEN NO APPARENT MALFUNCTIONS IN THE TAPE
        UNIT IS EVIDENT, ALL TIMINGS OF THE DIAGNOSTIC MAY BE ADJUSTED
        TO MATCH MEMORY SPEED AND NOT RESULT IN TIME-OUTS, BY PATCHING
        THAT FIXED DELAY ELEMENT "L$DLY".

        A PRESET COUNT OF 000000 RESIDES AT "L$DLY" IN LOCATION 2116 OF THE
        "HEADER" SECTION.

1.2 SYSTEM REQUIREMENTS
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1.2.1  HARDWARE REQUIREMENTS
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        PDP-11 PROCESSOR WITH 16K OR MORE OF MEMORY
        CONSOLE DEVICE (LA30,LA36,VT50,ETC.)
        PROGRAM LOAD DEVICE
        TU80 DRIVE AND UNIBUS ADAPTER MODULE
```

1.2.2 SOFTWARE REQUIREMENTS

DIAGNOSTIC SUPERVISOR

1.3 RELATED DOCUMENTS AND STANDARDS

XXDP+ USERS MANUAL MD-11-CHQUS
DIAGNOSTIC SUPERVISOR PROGRAM LISTING
PDP-11 DIAGNOSTIC SUPERVISOR INTERFACE SPECIFICATION.
PDP-11 DIAGNOSTIC SUPERVISOR PROGRAMMER'S GUIDE.
TU80 PROGRAMMING SPECIFICATION.
TU80 COMMAND PACKET SPECIFICATION.

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

ORDER OF HOST CPU DIAGNOSTIC USAGE:

1) CONTROL LOGIC PROGRAM - ALL TESTS.

2) DATA RELIABILITY PROGRAM:

A) BASIC FUNCTION TEST.
B) DATA RELIABILITY TEST.

1.5 ASSUMPTIONS

THE HARDWARE OTHER THAN THE SUBSYSTEM BEING TESTED IS ASSUMED TO WORK PROPERLY. FALSE ERRORS MAY BE REPORTED IF THE PROCESSOR, MEMORY, ETC., DO NOT FUNCTION PROPERLY.

1.6 DIAGNOSTIC HISTORY

REVISION A - 23-MAR-83 - ORIGINAL RELEASE
REVISION B - 17-APR-83 - FIX TEST 3 FOR NEW SPEED ALGORITHM

2.0 OPERATING INSTRUCTIONS

FOR OPERATING INSTRUCTIONS, PLEASE SEE CHAPTER 5 OF XXDP+ OPERATOR'S MANUAL.

2.1 HARDWARE PARAMETERS

ON A "N" RESPONSE TO "CHANGE HW?", THE DIAG SHALL RUN ASSUMING ONE UNIT AT TSSR = 172522 WITH A VECTOR = 224.

ON A "Y" RESPONSE TO "CHANGE HW?" QUESTION,THEN THE FOLLOWING QUESTIONS WILL BE ASKED ON A START COMMAND. THE VALUE LOCATED TO THE LEFT OF THE QUESTION MARK IS THE DEFAULT VALUE THAT WILL BE TAKEN ON A CARRIAGE RETURN RESPONCE.

TSSR ADDRESS (172522) ?

VECTOR (224) ?

THE VALIDITY OF THESE PARAMETERS CAN BE CHECKED BEFORE RUNNING THE TESTS BY SETTING THE FLAG "ADR" ON A STA, RES OR CON COMMAND.
THE SO CALLED AUTO DROP CODE SHALL THEN BE EXECUTED AFTER THE INIT CODE AND BEFORE THE HARDWARE TESTS ARE RUN. THAT CODE FIRST TESTS THE ADRRES OF THE TSSR(S). IF NO RESPONSE, IT DROPS THE UNIT(S) IMMEDIATELY WITH THE FOLLOWING MESSAGE:

```
        BUS TRAP AT XXXXXX            ( XXXXXX = TSSR AD )
        INTERFACE BAD OR NOT SET TO ABOVE AD.
```

ON A RESPONSE FROM THE INTERFACE, THE UNITS THAT ARE NOT READY OR NOT ON-LINE ARE DROPPED IMMEDIATELY. THE HARDWARE TESTS SHALL THEN BE RUN ON RESPONDING UNITS.

IF THE "ADR" FLAG IS NOT SET, THE READY AND OFF-LINE STATUS OF THE UNITS ARE CHECKED. A MESSAGE SHALL BE PRINTED EVERY SO OFTEN TO WARN THE OPERATOR OF UNITS BEING NOT READY OR OFF-LINE. THESE UNITS SHALL BE DROPPED AFTER A REASONABLE AMOUNT OF TIME (3 MIN ON A 11/70).

2.2 SOFTWARE PARAMETERS

THE FOLLOWING QUESTIONS ARE ASKED IF REQUESTED ON A START, RESTART, OR CONTINUE. THEY ALLOW FLEXABILITY IN THE WAY THE PROGRAM BEHAVES.

CLEAR COUNTERS (L) Y ?

RESET RANDOM VARIABLES (L) N ?

PRINT RECOVERABLE ERRORS (L) N ?

HALT AFTER EACH CMD (L) N ?

INHIBIT RECOVERY (L) N ?

BAD TAPE SPOT DETECTION (L) Y ?

DISABLE INTERRUPTS (L) N ?

INHIBIT RFC ERROR REPORTS (L) N ?

CHANGE CMD SEQUENCE (L) N ?

NOTE: THIS QUESTION SHOULD BE ANSWERED (N) UNLESS AN OPERATOR SELECTED SEQUENCE IS TO BE EXECUTED. IF THIS QUESTION WAS ANSWERED (N), NO MORE QUESTIONS WILL BE ASKED. IF THIS QUESTION WAS ANSWERED Y, THE FOLLOWING QUESTIONS MUST BE ANSWERED OR DEFAULTED WITH A <CR> ONLY:

CHARACTERISTICS CODE (O) 40 ?	(0,20,40,200)	(OCTAL)
CMD/2 (D) 13 ?	(1-27)	(DECIMAL)
BRF COUNT (D) 1 ?	(1-2K)	(DECIMAL)
# OF OPERATIONS (D) 1 ?	(1-32K)	(DECIMAL)
PATTERN (D) 7 ?	(0-8)	(DECIMAL)
CMD/3 (D) 4 ?	(1-27)	(DECIMAL)
BRF COUNT (D) 2048 ?	(1-2K)	(DECIMAL)
# OF OPERATIONS (D) 32000 ?	(1-32K)	(DECIMAL)
PATTERN (D) 7 ?	(0-8)	(DECIMAL)
CMD/4 (D) 3 ?	(1-27)	(DECIMAL)
BRF COUNT (D) 2048 ?	(1-2K)	(DECIMAL)
# OF OPERATIONS (D) 32000 ?	(1-32K)	(DECIMAL)
PATTERN (D) 7 ?	(0-8)	(DECIMAL)
CMD/5 (D) 2 ?	(1-27)	(DECIMAL)
BRF COUNT (D) 2048 ?	(1-2K)	(DECIMAL)
# OF OPERATIONS (D) 32000 ?	(1-32K)	(DECIMAL)
PATTERN (D) 7 ?	(0-8)	(DECIMAL)
CMD/6 (D) 13. ?	(1-27)	(DECIMAL)
BRF COUNT (D) 1 ?	(1-2K)	(DECIMAL)
# OF OPERATIONS (D) 1 ?	(1-32K)	(DECIMAL)
PATTERN (D) 7 ?	(0-8)	(DECIMAL)
CMD/7 (D) 27. ?	(1-27)	(DECIMAL)
BRF COUNT (D) 2048 ?	(1-2K)	(DECIMAL)
# OF OPERATIONS (D) 32000 ?	(1-32K)	(DECIMAL)
PATTERN (D) 7 ?	(0-8)	(DECIMAL)

```
622                                     CMD/8 (D) 27. ?                 (1-27)   (DECIMAL)
623                                     BRF COUNT (D) 2048 ?            (1-2K)   (DECIMAL)
624                                     # OF OPERATIONS (D) 32000 ?     (1-32K)  (DECIMAL)
625                                     PATTERN (D) 7 ?                 (0-8)    (DECIMAL)
626
627                                     NOTE:   THE PROGRAM AUTOMATICALLY INSERTS AN CHARACTERISTIC 40
628                                             AS THE FIRST COMMAND IN THE SEQUENCE TABLE.  IF A
629                                             DIFFERENT CHARACTERISTIC IS DESIRED, THE OPERATOR SHOULD
630                                             ENTER THAT CHARACTERISTIC CODE.  A TOTAL OF 7 COMMANDS
631                                             MAY BE ENTERED IN ADDITION TO THE SET CHARACTERISTICS
632                                             COMMAND.  IF THE OPERATOR WISHES TO USE LESS THAN 7
633                                             COMMANDS, AN END COMMAND MUST BE ENTERED AND THEN A
634                                             CONTROL Z (^Z) CAN BE ENTERED TO TERMINATE SOFTWARE DIAL
```

2.2.1 COMMAND LIST FOR USE IN SOFTWARE DIALOGUE.

CODE	COMMAND	DESCRIPTION
1 =	DRI	DRIVE INITIATE.
2 =	RDF	READ FORWARD.
3 =	RDR	READ REVERSE.
4 =	WRT	WRITE.
5 =	WTV	WRITE/VERIFY. IE. WRITE N RECORDS; READ REVERSE AND CHEC N RECORDS OF DATA; READ FORWARD AND CHECK N RECORDS.
6 =	SRF	SPACE RECORDS FORWARD.
7 =	SRR	SPACE RECORDS REVERSE.
8 =	RNR	READ NEXT REVERSE, IE. SPACE FWD, READ REV.
9 =	RNF	READ NEXT FORWARD, IE. READ FWD, SPACE REV.
10 =	RPF	READ PREVIOUS FWD, IE. SPACE REV, READ FWD.
11 =	RPR	READ PREVIOUS REV, IE. READ REV, SPACE FWD.
12 =	WRR	WRITE RETRY.
13 =	RWD	REWIND.
14 =	MBR	MESSAGE BUFFER RELEASE.
15 =	WTM	WRITE TAPE MARK.
16 =	WTR	WRITE TAPE MARK RETRY.
17 =	SFF	SPACE FILES FORWARD.
18 =	SFR	SPACE FILES REVERSE.
19 =	GES	GET EXTENDED STATUS.
20 =	ERS	ERASE 3 INCHES OF TAPE.
21 =	UNL	UNLOAD.
22 =	CLN	CLEAN TAPE
23 =	SCH	SET DEVICE CHARACTERISTIC. WHERE BRF=200, 40, 20, 0. 200 = ENABLE SKIP TAPE MARKS STOP (STOP AT LOGICAL EOT) 40 = ENABLE ATTENTION INTERRUPTS. 20 = ENABLE MESSAGE BUFFER RELEASE INTERRUPTS. SEE TU80 PROGRAMMING SPECIFICATION FOR DESCRIPTION.
24 =	NOT USED	
25 =	JMP	JUMP TO THE NTH COMMAND IN THE COMMAND SEQUENCE TABLE, WHERE N IS DEFINED IN THE BRF FIELD. THE NUMBER OF JUMPS IS ENTERED IN THE # OF OPERATIONS FI
26 =	DLY	DELAY "N" MILISECONDS WHERE N IS DEFINED IN THE # OF OPERATIONS. THIS DELAY IS USED BETWEEN EACH EXECUTABLE COMMAND.
27 =	END	END OF COMMAND SEQUENCE.

2.2.2 DATA PATTERN LIST FOR USE IN SOFTWARE DIALOGUE.

PATTERN #	DESCRIPTION.
0	INCREMENTING PATTERN. 0 - 377.
1	ALL "1"'S PATTERN.
2	ALL "0"'S PATTERN.
3	"1" BIT WALKING FROM R TO L IN A FIELD OF "0"'S.
4	"0" BIT WALKING FROM R TO L IF A FIELD OF "1"'S.
5	ALTERNATING "1" AND "0" BITS WITH ALTERNATE BYTES COMPL
6	ALTERNATING BYTES OF 000 AND 377.
7	RANDOM DATA PATTERN.
8	NO PATTERN GENERATION.

2.3 EXAMPLES OF SOFTWARE DIALOGUE

2.3.1 BASIC FUNCTION AND DATA RELIABILITY WITH ALL ERROR REPORTING ENABLED

A) RECEIVE PROMPT (DR>)
B) ENTER STA/TES:1-2<CR>
C) ANSWER HARDWARE QUESTIONS.
D) PROCEED WITH THE FOLLOWING DIALOGUE:

```
CHANGE SW (L) ?                          Y<CR>
CLEAR COUNTERS (L) N ?                   Y<CR>
RESET RANDOM VARIABLES (L) N ?           N<CR>
PRINT RECOVERABLE ERRORS  (L) N ?        Y<CR>
HALT AFTER EACH CMD (L) N ?              N<CR>
INHIBIT RECOVERY (L) N ?                 N<CR>
BAD TAPE SPOT DETECTION (L) Y ?          Y<CR>
DISABLE INTERRUPTS (L) N ?               N<CR>
INHIBIT RFC ERROR REPORT (L) N ?         N<CR>
CHANGE CMD SEQUENCE (L) N ?              N<CR>
```

2.3.2 TO SET UP A SCOPE LOOP FOR A FAILURE IN BASIC FUNCTIONS.

A) RECEIVE PROMPT (DR>)
B) ENTER STA/TES:1/FLA:LOE:IER:ISR:IDU<CR>
C) ANSWER HARDWARE QUESTIONS.
D) PROCEED WITH THE FOLLOWING DIALOGUE:

```
CHANGE SW (L) ?                          Y<CR>
CLEAR COUNTERS (L) N ?                   Y<CR>
RESET RANDOM VARIABLES (L) N ?           N<CR>
PRINT RECOVERABLE ERRORS  (L) N ?        N<CR>
HALT AFTER EACH CMD (L) N ?              N<CR>
INHIBIT RECOVERY (L) N ?                 N<CR>
BAD TAPE SPOT DETECTION (L) Y ?          N<CR>
DISABLE INTERRUPTS (L) N ?               N<CR>
INHIBIT RFC ERROR REPORT (L) N ?         Y<CR>
CHANGE CMD SEQUENCE (L) N ?              N<CR>
```

2.3.3 TO SET UP A SCOPE LOOP FOR A FAILURE IN DATA RELIABILITY

A) RECEIVE PROMPT (DR>)
B) ENTER STA/TES:5/FLA:IER:ISR:IDU/EOP:1000<CR>
C) ANSWER HARDWARE QUESTIONS.
D) PROCEED WITH THE FOLLOWING DIALOGUE:

```
CHANGE SW (L) ?                          Y<CR>
CLEAR COUNTERS (L) N ?                   Y<CR>
RESET RANDOM VARIABLES (L) N ?           N<CR>
PRINT RECOVERABLE ERRORS  (L) N ?        N<CR>
HALT AFTER EACH CMD (L) N ?              N<CR>
INHIBIT RECOVERY (L) N ?                 N<CR>
BAD TAPE SPOT DETECTION (L) Y ?          N<CR>
DISABLE INTERRUPTS (L) N ?               Y<CR>
INHIBIT RFC ERROR REPORT (L) N ?         Y<CR>
CHANGE CMD SEQUENCE (L) N ?              Y<CR>
CHARACTERISTICS CODE (O) 40 ?           40<CR>
CMD/2 (D) 5 ?                           13<CR>   (REWIND) (COULD
BRF COUNT (D) 2048 ?                     1<CR>
# OF OPERATIONS (D) 10 ?                1<CR>
PATTERN (D) 7 ?                          1<CR>
CMD/3 (D) 5 ?                            4<CR>   (WRITE) (COULD B
BRF (D) 2048 ?                        1000<CR>
# OF OPERATIONS (D) 10 ?              10000<CR>
PATTERN (D) 7 ?                          1<CR>
CMD/4 (D) 5 ?                           27<CR>   (END)   (COULD B
BRF (D) 2048 ?                          <^Z>
```

2.4 EXECUTION TIMES

2.4.1 SYSTEM CONFIGURATION

PDP11/34
MOS MEMORY
LA36
TU80

2.4.2 TEST EXECUTION TIMES

TEST 1 - BASIC FUNCTIONS - 30 SECONDS PER PASS.
TEST 2 - DATA RELIABILITY - 45 MINUTES PER PASS.
TEST 3 - WRITE/READ STREAMING TEST - 15 MINUTES PER UNIT.
TEST 4 - WRITE COMPATABILITY - 20 MINUTES PER PASS.
TEST 5 - READ COMPATABILITY - 20 MINUTES PER PASS.
TEST 6 - OPERATOR SELECTED SEQUENCE - DEPENDS ON SEQUENCE SELECTED.

NOTE: ALL EXECUTION TIMES ARE SHOWN FOR ONE UNIT OEPRATION.
APPROXIMATELY 10% WILL BE ADDED TO ALL EXECUTION TIMES
FOR EACH ADDITIONAL UNIT EXCEPT WITH TEST 3, WHERE EACH
ADDITIONAL UNIT ADDS 8 MINUTES TO THE EXECUTION TIME.

3.0 ERROR INFORMATION

3.1 ERROR REPORTING

ALL ERROR REPORTS EXCEPT FOR ERRORS #1 AND #17 INCLUDE A DUMP
OF THE FOLLOWING INFORMATION:

ERROR #, TEST #, SUBTEST #, PROGRAM COUNTER, UNIT #,
COMMAND, PREVIOUS COMMAND, PASS COUNT, # OF
RECORDS FROM BOT, RECORD READ COUNT, THE COMMAND PACKET, TSSR,
TCC, TSBA, RFC, AND THE EXTENDED STATUS REGISTERS
(SEE 2.3.14.1 FOR LIST OF COMMANDS).

STANDARD ERROR REPORT FORMAT:

```
CZTUV SFT ERR XXXXX  TST XXX  SUB XXX  PC: XXXXXX
(ASCII ERROR MESSAGE)
XXX CMD FAILED - UNIT X  PASS: XXXXX  RECORD: XXXXX
PREVIOUS CMD WAS  XXX          * RECORD READ: XXXXX *
CMDPKT  TSBA    RFC     TSSR    TCC
XXXXXX  XXXXXX  XXXXXX  XXXXXX  X
XXXXXX
XXXXXX
XXXXXX
XST0    XST1    XST2    XST3
XXXXXX  XXXXXX  XXXXXX  XXXXXX
```

* CAUTION *

INTERPRET THAT "RECORD READ" COUNT WITH CAUTION.
IF VERY DIFFERENT FROM RECORD COUNT TRACKED BY THE DIAGNOST
POSITION IS NOT NECESSARELY LOST. ERRORS IN READING THAT
RECORD MIGHT HAVE CAUSED RECORD COUNT TO BE ERRONEOUSLY
READ FROM TAPE.
IN TEST 2, IF DIAGNOSTIC IS RESTARTED OR CONTINUED, RECORD
IS RESET TO ZERO ALTHOUGH TAPE WAS NOT REWOUND. THIS IS
NECESSARY BECAUSE THERE IS NO ACCURATE WAY TO DETERMINE
ON WHAT RECORD COUNT OF WHAT UNIT THE DIAGNOSTIC WAS HALTED
BEFORE RESTARTING OR CONTINUING.
IT IS SUGGESTED THAT A "PRINT" BE REQUESTED WHEN HALTING DI
TO GET A PRINT OF THE RECORD COUNT WHEN HALTED.

EXAMPLE OF AN ERROR REPORT:

```
CZTUV SFT ERR 00009  TST 002  SUB 000  PC: 010606
RECOVERABLE ERROR
WRT CMD FAILED - UNIT 2  PASS:     2  RECORD:   254
PREVIOUS CMD WAS  WRT
CMDPKT  TSBA    RFC     TSSR    TCC
100005  002324  000000  100210  4
051766
000000
```

```
                                                    000371
                                                    XST0    XST1    XST2    XST3
                                                    000350  000002  100004  000000


                    3.1.1   ERROR #1 - COMMAND PACKET ADDRESS NOT ON A MODULO 4 BOUNDRY:

                            IF THIS ERROR IS REPORTED, THE PROGRAM DID NOT LOAD PROPERLY.
                            THIS IS A SYSTEM FATAL ERROR AND THE PROGRAM MUST BE RELOADED TO
                            CORRECT IT.


                    3.1.2   ERROR #2 - TU80 NOT READY:

                            BEFORE ANY COMMAND IS ISSUED TO THE TU80 THE SUBSYSTEM READY
                            BIT IN THE TSS4 IS CHECKED.  IF THE SSR IS NOT SET, THE PROGRAM
                            REPORTS THE NOT READY ERROR.  THIS IS A FATAL DEVICE ERROR AND
                            THE DEVICE WILL BE DROPPED FROM THE TEST SEQUENCE UNLESS THE IDU
                            OPTION IS USED.


                    3.1.3   ERROR #3 - NO RESPONSE ERROR:

                            ONCE THE TSDB IS LOADED, THE TU80 HAS ONE MILLISECOND TO RESPOND
                            OR THE PROGRAM REPORTS A NO RESPONSE ERROR.  THIS IS A FATAL
                            DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST SEQUENCE
                            UNLESS THE IDU OPTION IS USED.


                    3.1.4   ERROR #4 - NO INTERRUPT ERROR:

                            COMMAND WAS ISSUED AND NO INTERRUPT RECEIVED.  THE PROGRAM REPORTS
                            THAT NO INTERRUPT OCCURRED.  THIS IS A FATAL DEVICE ERROR AND
                            THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU
                            OPTION IS USED.


                    3.1.5   SPECIAL CONDITION ERRORS:

                            IF, DURING EXECUTION, AN INCIDENT OCCURS FORCING THE TSSR
                            SPECIAL CONDITION BIT TO SET, THE PROGRAM WILL SELECT ONE OF
                            8 ERROR HANDLING ROUTINES, DEPENDING ON THE TERMINATION CLASS
                            CODE.

                            THE TERMINATION CLASS CODES IN THE TSSR ARE PROCESSED AS FOLLOWS
                            WHEN SPECIAL CONDITION IS SET:


                    3.1.5.1 ERROR #5 - TERMINATION CLASS CODE 0, UNDEFINED SPECIAL CONDITION

                            THE ERROR IS REPORTED, A HARD ERROR IS LOGGED
                            AND THE PROGRAM PROCEEDS NORMALLY.


                    3.1.5.2 ERROR #6 - TERMINATION CLASS CODE 1, ATTENTION CONDITION
```

THIS TCC INDICATES THAT THE DRIVE HAS UNDERGONE A STATUS CHANGE
SUCH AS GOING OFFLINE OR COMING ONLINE. THIS IS A FATAL DEVICE
ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS
THE IDU OPTION IS USED.

3.1.5.3 ERROR #7 - TERMINATION CLASS CODE 2, TAPE STATUS ALERT

A STATUS CONDITION HAS BEEN ENCOUNTERED THAT MAY HAVE SIGNIFICANCE
TO THE PROGRAM. BITS OF INTEREST INCLUDE TMK, RLS, LET, RLL, EOT.
ACTION TAKEN DEPENDS ON THE TEST BEING EXECUTED.
IF THE CONDITION IS UNEXPECTED, THE ERROR IS REPORTED AND
A HARD ERROR IS LOGGED. THE PROGRAM PROCEEDS NORMALLY.

3.1.5.4 ERROR #8 - TERMINATION CLASS CODE 3, FUNCTION REJECT

THE SPECIFIED FUNCTION WAS NOT INITIATED. BITS OF INTEREST ARE
RMR, OFL, VCK, BOT, ILC, WLE, ILA, AND NBA. THIS IS A FATAL
DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE
UNLESS THE IDU OPTION IS USED.

31.5.5 ERROR #9 - TERMINATION CLASS CODE 4, RECOVERABLE ERROR

TAPE POSITION IS ONE RECORD BEYOND WHAT ITS POSITION WAS WHEN
THE FUNCTION WAS INITIATED. RECOVERY PROCEDURE IS TO LOG THE
ERROR AND ISSUE THE APPROPRIATE RETRY COMMAND. IF RETRY LIMIT
IS REACHED BEFORE THE ERROR IS RECOVERED, RETRY LIMIT EXCEEDED
IS REPORTED AS DESCRIBED IN ERROR #14 BELOW.

3.1.5.6 ERROR #10 - TERMINATION CLASS CODE 5, RECOVERABLE ERROR

TAPE POSITION HAS NOT CHANGED. RECOVERY PROCEDURE IS TO LOG THE
ERROR AND RE-ISSUE THE ORIGINAL COMMAND. IF RETRY LIMIT IS
REACHED BEFORE THE ERROR IS RECOVERED, RETRY LIMIT EXCEEDED
IS REPORTED AS DESCRIBED IN ERROR #14 BELOW.

3.1.5.7 ERROR #11 - TERMINATION CLASS CODE 6, UNRECOVERABLE ERROR

TAPE POSITION HAS BEEN LOST. THE ONLY VALID RECOVERY PROCEDURE IS TO
REWIND AND START OVER AT BOT UNLESS THE TAPE HAS LABELS OR SEQUENCE
NUMBERS. IF DENSITY CHECK IS SET THIS DIAGNOSTIC WILL REWIND AND
RETRY THE COMMAND, OTHERWISE THIS IS A FATAL DEVICE ERROR AND THE
DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED

3.1.5.8 ERROR #12 - TERMINATION CLASS CODE 7, FATAL SUBSYSTEM ERROR

THE SUBSYSTEM IS INCAPABLE OF PROPERLY PERFORMING COMMANDS OR AT
LEAST ITS INTEGRITY IS SERIOUSLY QUESTIONABLE. REFER TO THE
FATAL CLASS CODE FIELD IN THE TSSR REGISTER FOR ADDITIONAL INFOR-
MATION ON THE TYPE OF FATAL ERROR. THE DEVICE WILL BE DROPPED
FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

3.1.6 ERROR #13 - RFC NON-ZERO ERROR:

IF, AFTER EXECUTION, THE RESIDUAL FRAME COUNT IS NON-ZERO, THE ERROR IS REPORTED AND A HARD ERROR IS LOGGED. THE PROGRAM THEN PROCEEDS NORMALLY. THE REPORTING AND LOGGING OF THESE ERRORS IS OPTIONAL.

3.1.7 ERROR #14 - RETRY LIMIT EXCEEDED:

ON A WRITE COMMAND THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

ON A READ COMMAND THIS ERROR IS LOGGED AS A HARD ERROR AND THE PROGRAM PROCEEDS NORMALLY.

3.1.8 ERROR #15 - TOO MANY INTERRUPTS:

IF MORE THAN ONE INTERRUPT OCCURS PER COMMAND, THIS ERROR IS REPORTED. THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

3.1.9 ERROR #16 - CAPSTAN RUNAWAY:

CAPSTAN DID NOT STOP WITHIN ACCEPTABLE WINDOW AFTER LAST COMMAND. THE PROGRAM WILL ISSUE A GET STATUS COMMAND BEFORE REPORTING THE ERROR SO THAT THE DEAD TRACK FIELD IN EXTENDED STATUS REGISTER 2 WILL CONTAIN THE TACH COUNT WHEN THE TAPE STOPPED.
THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

3.1.10 ERROR #17 - DATA COMPARE ERROR:

IF A DATA VALIDATION ERROR OCCURS DURING A WRITE/VERIFY COMMAND, THE PROGRAM PRINTS WHAT THE DATA SHOULD HAVE BEEN AND WHAT THE DATA WAS, AND PRINTS THE BYTE AND RECORD NUMBER THE ERROR OCCURRED ON. ONLY THE FIRST 10 BYTES IN ERROR PER RECORD ARE PRINTED. THE TOTAL # OF BYTES IN ERROR PER RECORD IS ALSO PRINTED. A HARD ERROR IS LOGGED AND THE PROGRAM PROCEEDS NORMALLY.

3.2 ERROR HALTS

ERROR HALTS ARE SUPPORTED PER DESCRIBED IN THE PREVIOUS SECTION WITH /FLAG:HOE. THERE ARE NO OTHER HALTS.

```
1008                                    4.0 PERFORMANCE REPORT
1009                                        ------------------
1010
1011                                        UNIT X   PASS:XXXXX  RECORD:XXXXX
1012                                        BYTES WRITTEN  XXX,XXX,XXX,XXX
1013                                        BYTES READ REV XXX,XXX,XXX,XXX
1014                                        BYTES READ FWD XXX,XXX,XXX,XXX
1015                                                          WRT       RDR      RDF
1016                                        RECOVERABLE ERRORS    XXXXX     XXXXX    XXXXX
1017                                        UNRECOVERABLE ERRORS  XXXXX     XXXXX    XXXXX
1018
1019                                        SPEC COND   HARD   FATAL   COMPARE
1020                                           XXXXX   XXXXX   XXXXX   XXXXX
1021
1022
1023
1024
1025
1026                                    5.0 TEST SUMMARIES
1027                                        --------------
1028
1029                                    5.1     TEST 1 -        BASIC FUNCTIONS.
1030
1031                                                            EXECUTES AND VERIFIES CORRECT COMPLETION OF ALL TU80 FUN
1032
1033                                                            SUBTEST 1  - SET CHAR, DRIVE INIT, GET STATUS.
1034                                                                       + SET CHARACTERISTIC 200.
1035                                                                       + DRIVE INITIATE.
1036                                                                       + SET CHARACTERISTIC  20.
1037                                                                       + GET STATUS
1038                                                                       + SET CHARACTERISTIC  40.
1039
1040                                                            SUBTEST 2  - REWIND.
1041                                                                       + REWIND.
1042                                                                       + REWIND AT BOT.
1043
1044                                                            SUBTEST 3  - WRITE/VERIFY.
1045                                                                       + WRITE/VERIFY PATTERN 1.
1046                                                                       + WRITE/VERIFY PATTERN 2.
1047                                                                       + WRITE/VERIFY PATTERN 3.
1048                                                                       + WRITE/VERIFY PATTERN 4.
1049                                                                       + WRITE/VERIFY PATTERN 5.
1050                                                                       + WRITE/VERIFY PATTERN 6.
1051                                                                       + WRITE/VERIFY PATTERN 0.
1052
1053                                                            SUBTEST 4  - WRITE TAPE MARK, ERASE.
1054                                                                       + WRITE TAPE MARK.
1055                                                                       + WRITE 10 RECORDS
1056                                                                       + ERASE 10 TIMES
1057                                                                       + WRITE TAPE MARK.
1058                                                                       + WRITE TAPE MARK RETRY.
1059
1060                                                            SUBTEST 5  - SPACE FILES.
1061                                                                       + SPACE 2 FILES REVERSE.
1062                                                                       + SPACE 2 FILES FORWARD.
1063                                                                       + SPACE 2 FILES REVERSE.
```

```
                                                                K 2
1064                                        + SPACE 2 FILES FORWARD.
1065
1066                                SUBTEST 6  - SPACE RECORDS.
1067                                        + REWIND.
1068                                        + SPACE 7 RECORDS FORWARD.
1069                                        + SPACE 7 RECORDS REVERSE.
1070                                        + SPACE 7 RECORDS FORWARD.
1071                                        + SPACE 7 RECORDS REVERSE.
1072
1073                                SUBTEST 7  - WRITE RETRY.
1074                                        + REWIND.
1075                                        + WRITE DATA.
1076                                        + WRITE RETRY.
1077
1078                                SUBTEST 8  - READ REV RETRY.
1079                                        + READ REVERSE.
1080                                        + READ NEXT REVERSE.
1081                                        + READ NEXT FORWARD.
1082
1083                                SUBTEST 9  - READ FWD RETRY.
1084                                        + READ FORWARD.
1085                                        + READ PREVIOUS FORWARD.
1086                                        + READ PREVIOUS REVERSE.
1087
1088                                SUBTEST 10 - CLEAN.
1089                                        + CLEAN.
1090                                        + REWIND.
1091
1092                                SUBTEST 11  - WRITE/VERIFY SWAPPED DATA BYTES.
1093                                        + WRITE/VERIFY EVEN LENGTH (RECORD 1).
1094                                        + WRITE/VERIFY ODD LENGTH (RECORD 2).
1095                                        + SET DATA BYTE SWAP.
1096                                        + WRITE/VERIFY EVEN LENGTH (RECORD 3).
1097                                        + WRITE/VERIFY ODD LENGTH (RECORD 4).
1098                                        + CLEAR DATA BYTE SWAP.
1099
1100                                SUBTEST 12  - READ SWAPPED DATA BYTES.
1101                                        + READ REV RECORD 4.
1102                                        + READ REV RECORD 3.
1103                                        + SET DATA BYTE SWAP.
1104                                        + READ REV RECORD 2.
1105                                        + READ REV RECORD 1.
1106                                        + READ FWD RECORD 1.
1107                                        + READ FWD RECORD 2.
1108                                        + CLEAR DATA BYTE SWAP.
1109                                        + READ FWD RECORD 3.
1110                                        + READ FWD RECORD 4.
```

```
1112                                    5.2     TEST 2 -        DATA RELIABILITY.
1113
1114                                                              1. THE TAPE IS INITIATED WITH THE FOLLOWING COMMANDS:
1115                                                                    SET CHARACTERISTIC 40
1116                                                                    REWIND
1117                                                                    WRITE/VERIFY 31 RECORDS OF RANDOM LENGTH AND DAT
1118                                                              2. WRITE AND READ COMMANDS ARE SELECTED AT RANDOM AND
1119                                                                 EXECUTED A RANDOM NUMBER OF TIMES WITH RANDOM
1120                                                                 LENGTHS AND RANDOM PATTERN UNTIL END OF TAPE IS REA
1121                                                              3. AT THE END OF EACH PASS, A REWIND COMMAND IS ISSUED
1122                                                                 A PERFORMANCE REPORT IS PRINTED.
1123
1124                                                                    NOTE:   IF A RESTART COMMAND IS USED TO INITIATE
1125                                                                            TEST 1, THE INITIAL REWIND COMMAND IS NO
1126
1127                                    5.3     TEST 3 -        WRITE AND READ STREAMING TEST.
1128
1129                                                            1. REWINDS ALL UNITS, THEN ON EACH UNIT:
1130
1131                                                                           >>>  REPEAT TWICE  <<<
1132
1133                                                            **************************************************************
1134
1135                                                            2. WRITE PATTERN 5 FOR 7000 - 1 KBYTE RECORDS.
1136                                                               THE SPEED ALGORITHM IN THE TU80 WILL ENABLE 100 IPS S
1137                                                            3. READ REVERSE FOR 3500 RECORDS AT 100 IPS STREAMING.
1138                                                            4. READ REVERSE FOR 3500 RECORDS AT 25 IPS STREAMING.
1139                                                            5. READ FORWARD FOR 3500 RECORDS AT 100 IPS STREAMING.
1140                                                            6. READ FORWARD FOR 3500 RECORDS AT 25 IPS STREAMING.
1141                                                            7. WRITE A TAPE MARK
1142
1143                                                            **************************************************************
1144
1145                                                                           >>>  END REPEAT  <<<
1146
1147                                                            NOTE: 7000(10) RECORDS OF 1000(10) BYTES ARE WRITTEN AND
1148                                                            ON EACH ITERATION.
1149
1150                                    5.4     TEST 4 -        WRITE COMPATABILITY/WRITE UTILITY.
1151
1152                                                            REWINDS AND WRITES RECORDS OF RANDOM LENGTHS
1153                                                            AND RANDOM DATA FROM BOT TO EOT.
1154
1155
1156                                    5.5     TEST 5 -        READ COMPATABILITY/READ UTILITY.
1157
1158                                                            REWINDS AND READS ENTIRE TAPE, FORWARD AND REVERSE.
1159
1160
1161                                    5.6     TEST 6 -        EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.
1162
1163                                                            THE SEQUENCE OF COMMANDS ENTERED BY THE OPERATOR
1164                                                            IS EXECUTED.  IF NO COMMANDS WERE ENTERED, A
1165                                                            DEFAULT SEQUENCE OF REWIND/WRITE/READ REV/READ FWD/REWIN
1166                                                            OF ENTIRE TAPE IS EXECUTED WITH RANDOM PATTERN
1167                                                            AND RECORD LENGTH OF 2048 BYTES.
```

6.0 DEVICE INFORMATION TABLES

6.1 GENERAL

THE TU80 SUBSYSTEM IS A REEL-TO-REEL TAPE TRANSPORT WITH AN INTEGRATED FORMATTER. AN ADAPTER MODULE CONNECTS THE DRIVE TO ANY PROCESSOR WITH A UNIBUS. THE SUBSYSTEM READS AND WRITES AT EITHER 25 OR 100 IPS AND RECORDS AT 1600 BPI, PHASE ENCODED, ANSI STANDARD FORMAT. TAPE SPEEDS OF 25 OR 100 IPS ARE AUTOMATICALLY SELECTED BY THE CONTROLLER ACCORDING TO A SPEED ALGORITHM WITHIN THE CONTROLLERS' FIRMWARE. THE HOST SOFTWARE MAY SELECT THE 100 IPS SPEED; THE 25 IPS SPEED IS NOT USER-SELECTABLE. IN ADDITION, THE DRIVE IS MICROPROCESSOR CONTROLLED AND HAS SELF-CONTAINED LOGIC AND FUNCTIONAL DIAGNOSTICS. THE ADAPTER MODULE ENABLES THE TU80 TO BE 100% PROTOCOL COMPATIBLE WITH THE TS11.

OPERATIONALLY, THE TU80 IS UNIQUE IN A NUMBER OF WAYS:

A. ONLY ONE REGISTER MAY BE WRITTEN - TSDB (TAPE SYSTEM DATA BUFFER),

B. TWO REGISTERS MAY BE READ - TSSR AND TSBA (TAPE SYSTEM STATUS REGISTER AND TAPE SYSTEM BUS ADDRESS REGISTER),

C. COMMANDS ARE NOT WRITTEN TO THE DRIVE; RATHER, COMMAND POINTERS ARE WRITTEN WHICH POINT TO COMMAND PACKETS SOMEWHERE IN CPU MEMORY. THE COMMAND POINTER IS USED BY THE TS04 SUBSYSTEM TO FETCH THE WORD(S) WITHIN THE COMMAND PACKET. THE WORDS WITHIN THE COMMAND PACKET ARE:

    1. COMMAND WORD
    2. LOW ORDER BUFFER ADDRESS
    3. HIGH ORDER BUFFER ADDRESS
    4. BYTE COUNT

D. THE TSSR CONTAINS ALL THE INFORMATION WHICH WILL BE NECESSARY TO DETERMINE WHETHER:
    1. THE DRIVE IS READY TO ACCEPT ANOTHER COMMAND,
    2. THE PREVIOUS COMMAND WAS EXECUTED WITHOUT ERROR.

IF EITHER OF THE ABOVE CONDITIONS IS UNTRUE AT "JOB DONE" OR "COMMAND INITIATION" TIME,IT MAY BE NECESSARY TO GET THE EXTENDED STATUS REGISTERS TO DETERMINE WHAT ACTION IS TO BE TAKEN AND/OR LOG THE ERROR INFORMATION.

E. EXTENDED STATUS REGISTERS ARE NOT READ DIRECTLY FROM DRIVE REGISTERS; RATHER, A "GET STATUS" COMMAND IS ISSUED WHICH WILL CAUSE THE TU80 TO TRANSFER EXTENDED STATUS INFORMATION TO THE MEMORY AREA POINTED TO BY THE BUFFER ADDRESS OF THE "GET STATUS" COMMAND. THERE ARE FOUR EXTENDED STATUS REGISTERS. SEE 6.3.

F. THE TSDB MUST BE WRITTEN WITH A DATO INSTRUCTION TO PROPERLY WRITE THE COMMAND POINTER. A DATOB WILL CAUSE A MAINTENANCE FUNCTION. A DATO TO THE TSSR WILL CAUSE SUBSYSTEM INIT.

G. COMMAND PACKETS MUST RESIDE ON DIVIDE BY FOUR MEMORY BOUNDARIES (AS OPPOSED TO DIVIDE BY 2 OR WORD BOUNDARIES).

6.2 UNIBUS INTERFACE SPECIFICATIONS

TU80	INT. VECTOR	UNIBUS ADDRESS	REGISTER
FIRST	224	772520	TSBA/TSDB
		772522	TSSR
SECOND	FLOAT	772524	TSBA/TSDB
		772526	TSSR
THIRD	FLOAT	772530	TSBA/TSDB
		772532	TSSR
FOURTH	FLOAT	772534	TSBA/TSDB
		772536	TSSR

6.3 BIT DEFINITIONS FOR TU80 REGISTERS

6.3.1 TU80 REGISTER SUMMARY

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01
TSBA	A15	A14	A13	A12	A11	A10	A09	A08	A07	A06	A05	A04	A03	A02	A0
TSDB	P15	P14	P13	P12	P11	P10	P09	P08	P07	P06	P05	P04	P03	P02	P1
TSSR	SC			RMR	NXM	NBA	A17	A16	SSR	OFL	FC1	FC0	TC2	TC1	TC
XST0	TMK		RLS	LET	RLL	WLE	NEF	ILC	ILA		ONL	IE	VCK	PED	WLK	BO
XST1	DLT			COR	CRS		DBF									UN CR
XST2	OPM		SIP	BPE	CAF		WCF		DTP	DT7	DT6	DT5	DT4	DT3	DT2	DT
XST3	MICRO DIAGNOSTIC ERROR CODE									OPI	REV		DCK			LX

TERMINATION CLASS CODES (TSSR TC0-TC2):

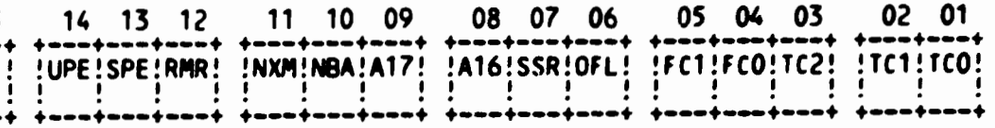
0 = NORMAL TERMINATION
1 = ATTENTION CONDITION
2 = TAPE STATUS ALERT
3 = FUNCTION REJECT
4 = RECOVERABLE ERROR - TAPE POSITION = ONE RECORD
DOWN TAPE FROM START OF FUNCTION
5 = RECOVERABLE ERROR - TAPE NOT MOVED
6 = UNRECOVERABLE ERROR - TAPE POSITION LOST
7 = FATAL CONTROLLER ERROR

FATAL CLASS CODES (TSSR FC0-FC1):

0 = MICRO DIAGNOSTIC FAILURE (DISPLAYED IN TU80 OPERATOR PANEL AND
1 = I/O SEQUENCER CROM PARITY ERROR.
2 = MICROPROCESSOR CROM PARITY ERROR.
SILO PARITY ERROR.
SERIAL BUS PARITY ERROR DETECTED AT TU80 (SPE).
SERIAL BUS PARITY ERROR DETECTED AT TS04 (BPE).
FATAL ERROR HALTS 1750-1777 IN TS04 PROGRAM COUNTER DISPLAY.
3 = LOSS OF AC POWER HAS BEEN DETECTED.

6.3.2 TU80 STATUS REGISTER (TSSR)

UNIBUS ADDRESS + 2 - READ ONLY



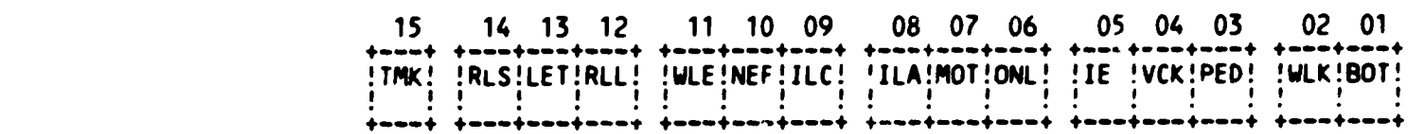
BIT	NAME	TCC	DEFINITION
15	SC	S	SPECIAL CONDITION. WHEN SET, INDICATES THAT THE LAST COMMAND DID NOT COMPLETE WITHOUT INCIDENT. SPECIFICALLY, EITHER AN ERROR WAS DETECTED OR AN EXCEPTION CONDITION OCCURRED. EXCEPTION CONDITIONS CAN BE TAPE MARKS ON READ COMMANDS, REVERSE MOTION AND AT BOT, EOT WHILE WRITING, ETC. MAY ALSO BE SET BY THE ERROR BITS CONTAINED IN THE TSSR REGISTER: UPE, SPE, RMR, AND NXM. THE TERMINATION CLASS BITS ARE SOMET OTHER THAN 0 (UNLESS RMR IS THE ONLY ERROR - SEE RM
14	NOT USED		
13	NOT USED		
12	RMR	S	REGISTER MODIFICATION REFUSED. SET BY THE TU80 WHEN A COMMAND POINTER IS LOADED INTO TSDB AND SUB-SYSTEM READY (SSR) IS NOT SET. NOTE THAT THIS BIT CAUSES SPECIAL CONDITION BUT NO TERMINATIO CLASS (IN FACT, THE TS04 NEVER SEES THIS ERROR) BECAUSE ON A SYSTEM WITH NO BUGS, THIS BIT MAY COME UP ON AN ATTENTION MESSAGE. IF ATTNS ARE NOT ENABLED, THIS BIT COMING UP IS AN INDICATION OF EITHER A FATAL CONTROLLER ERROR OR A SOFTWARE BUG.
11	NXM	4/5	NON-EXISTENT MEMORY. SET BY THE TU80 WHEN TRYING TO TRANSFER TO OR FROM A MEMORY LOCATION WHICH DOES NOT EXIST. MAY OCCUR WHEN FETCHING THE COMMAND PACKET, FETCHING OR STORING DATA, OR STORING THE MESSAGE PACKET.
10	NBA	S	NEED BUFFER ADDRESS. WHEN SET, INDICATES THAT THE TS04 NEEDS A MESSAGE BUFFER ADDRESS. THIS BIT IS CLEARED DURING THE SET CHARACTERISTICS COMMAND (IF A GOOD ADDRESS WAS GIVEN).
09	A17	S	BUS ADDRESS BIT 17. A17 AND A16 (BIT 08) TRACK

			THE VALUES OF BITS 17 AND 16 OF THE TSBA REGISTER.
08	A16	S	BUS ADDRESS BIT 16. SEE A17 (BIT 09).
07	SSR	S	SUB-SYSTEM READY. WHEN SET, INDICATES THAT THE TU80 SUBSYSTEM IS NOT BUSY AND IS READY TO ACCEPT A NEW COMMAND POINTER.
06	OFL	S,1,3	OFF-LINE. WHEN SET, INDICATES THAT THE TS04 IS OFF-LINE AND UNAVAILABLE FOR ANY TAPE MOTION COMMANDS. THIS BIT CAN CAUSE A TERMINATION CLASS OF 1 (ON ATTN INTERRUPT) OR 3 (RESULTS IN NEF).
05	FC1	7	FATAL TERMINATION CLASS 01. FC1 AND FC0 (BIT 04) ARE USED TO INDICATE THE TYPE OF FATAL ERROR WHICH HAS OCCURRED ON THE TS04. THESE BITS ARE VALID ONLY WHEN SC IS SET AND THE TERMINATION CLASS CODE BITS ARE ALL SET (111).
04	FC0	7	FATAL TERMINATION CLASS 00. SEE FC1 (BIT 05).
03	TC2	S	TERMINATION CLASS BIT 02. THIS BIT, ALONG WITH THE TC1 AND TC0 BITS, ACT AS AN OFFSET VALUE WHENEVER AN ERROR OR EXCEPTION CONDITION OCCURS ON A COMMAND. EACH OF THE EIGHT POSSIBLE VALUES OF THIS FIELD REPRESENT A PARTICULAR CLASS OF ERRORS OR EXCEPTIONS. THE CONDITIONS IN EACH CLASS HAVE SIMILAR SIGNIFICANCE AND, AS APPLICABLE, RECOVERY PROCEDURES. THE CODE PROVIDED IN THIS FIELD IS EXPECTED TO BE UTILIZED AS AN OFFSET INTO A DISPATCH TABLE FOR HANDLING OF THE CONDITION.
02	TC1	S	TERMINATION CLASS BIT 01. SEE TC2 (BIT 03).
01	TC0	S	TERMINATION CLASS BIT 00. SEE TC2 (BIT 03).
00	-	-	NOT USED.

UNIBUS ADDRESS + 2 - WRITE ONLY

SUBSYSTEM INITIALIZE

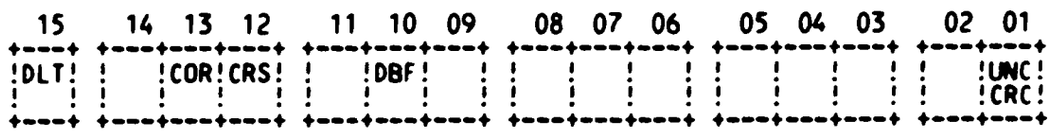
6.3.3 EXTENDED STATUS REGISTER 0 (XSTAT0)



BIT	NAME	TCC	DEFINITION
15	TMK	S,2	TAPE MARK DETECTED. SET WHENEVER A TAPE MARK WAS DETECTED DURING A READ, SPACE, OR SKIP COMMAND AND AS A RESULT OF THE WRITE TAPE MARK OR WITE TAPE MARK RETRY COMMANDS.
14	RLS	2	RECORD LENGTH SHORT. THIS BIT INDICATES THAT EITHER THE RECORD'S LENGTH WAS SHORTER THAN THE BYTE COUNT ON READ OPERATIONS, A SPACE RECORD OPERATION ENCOUNTERED A TAPE MARK OR BOT BEFORE THE POSITION COUNT WAS EXHAUSTED, OR A SKIP TAPE MARKS COMMAND WAS TERMINATED BY ENCOUNTERING BOT OR A DOUBLE TAPE MARK (IF THAT OPERATIONAL MODE IS ENABLED, SEE LET) PRIOR TO EXHAUSTING THE POSITION COUNTER.
13	LET	2	LOGICAL END OF TAPE. SET ONLY ON THE SKIP TAPE MARKS COMMAND WHEN EITHER TWO CONTIGUOUS TAPE MARKS ARE DETECTED OR WHEN MOVING OFF OF BOT AND THE FIRST RECORD ENCOUNTERED IS A TAPE MARK. THE SETTING OF THIS BIT WILL NOT OCCUR UNLESS THIS MODE OF TERMINATION IS ENABLED THROUGH USE OF THE SET CHARACTERISTICS COMMAND.
12	RLL	2	RECORD LENGTH LONG. WHEN SET, THIS BIT INDICATES THAT THE RECORD READ WAS LONGER THAN THE BYTE COUNT SPECIFIED.
11	WLE	3,6	WRITE LOCK ERROR. WHEN SET, INDICATES THAT A WRITE OPERATION WAS ISSUED BUT THE MOUNTED TAPE DID NOT CONTAIN A WRITE ENABLE RING OR THE WRT LOCK SWITCH ACTIVATED DURING THE OPERATION.
10	NEF	3	NON-EXECUTABLE FUNCTION. WHEN SET, INDICATES THAT THE COMMAND COULD NOT BE EXECUTED DUE TO ONE OF THE FOLLOWING CONDITIONS: - THE COMMAND SPECIFIED REVERSE TAPE DIRECTION BUT THE TAPE WAS ALREADY POSITIONED AT BOT. - THE ISSUING OF ANY COMMAND, EXCEPT REWIND,

				UNLOAD, OR A COMMAND WITH THE CLEAR VOLUME CHECK (CVC) BIT SET, WHEN THE VOLUME CHECK BIT IS SET.
				- ANY COMMAND, EXCEPT GET STATUS OR DRIVE INITIALIZE, WHEN THE TS04 IS OFF-LINE.
				- ANY WRITE COMMAND WHEN THE TAPE DOES NOT CONTAIN A WRITE ENABLE RING (WRITE LOCK STATUS - WLS).
	09	ILC	3	ILLEGAL COMMAND. SET WHEN A COMMAND IS ISSUED AND EITHER ITS COMMAND FIELD OR ITS COMMAND MODE FIELD CONTAINS CODES WHICH ARE NOT SUPPORTED BY THE TS04.
	08	ILA	3	ILLEGAL ADDRESS. (MORE THAN 18 BITS OR ODD WHEN AN EVEN ADDRESS IS REQUIRED.)
	07	NOT USED		
	06	ONL	S	ON LINE. WHEN SET, INDICATES THAT THE TS04 IS ON-LINE AND OPERABLE.
	05	IE	S	INTERRUPT ENABLE. REFLECTS THE STATE OF THE INTERRUPT ENABLE BIT SUPPLIED ON THE LAST COMMAND.
	04	VCK	S	VOLUME CHECK. WHEN SET, INDICATES THAT THE DRIVE HAS BEEN EITHER POWERED DOWN OR TURNED OFF-LINE. CLEARED BY THE CLEAR VOLUME CHECK (CVC) BIT IN THE COMMAND HEADER WORD. THIS BIT CAN CAUSE A TERMINATION CLASS OF 3.
	03	PED	S	PHASE ENCODED DRIVE. WHEN SET, INDICATES THAT THE TS04 IS CAPABLE OF READING AND WRITING ONLY 1600 BPI PHASE ENCODED DATA. WHEN RESET, INDICATES THAT THE TS04 HAS ONLY 800 BPI NRZI DATA CAPABILITIES.
	02	WLK	S,3	WRITE LOCKED. WHEN SET, INDICATES THAT THE MOUNTED REEL OF TAPE DOES NOT HAVE A WRITE-ENABLE RING INSTALLED. THE TAPE IS, THEREFORE, WRITE PROTECTED.
	01	BOT	S,3	BEGINNING OF TAPE. WHEN SET, INDICATES THAT THE TAPE IS POSITIONED AT THE LOAD POINT AS DENOTED BY THE BOT REFLECTIVE STRIP ON THE TAPE.
	00	EOT	S,2	END OF TAPE. THIS BIT IS SET WHENEVER THE TAPE IS POSITIONED AT OR BEYOND THE END OF TAPE REFLECTIVE STRIP. DOES NOT RESET UNTIL THE TAPE PASSES OVER THE REFLECTIVE STRIP IN THE REVERSE DIRECTION UNDER PROGRAM CONTROL.

6.3.4 EXTENDED STATUS REGISTER 1 (XSTAT1)



BIT	NAME	TCC	DEFINITION
15	DLT	4	DATA LATE. SET WHEN THE I/O SILO IS FULL ON A READ OR EMPTY ON A WRITE. THESE CONDITIONS OCCUR WHENEVER THE UNIBUS LATENCY EXCEEDS THE DATA TRANSFER RATE OF THE TS04.
14	-	-	NOT USED.
13	COR	S	CORRECTABLE DATA. IN PHASE ENCODED MODE, A CORRECTABLE DATA ERROR HAS BEEN ENCOUNTERED.
12	CRS	4	CREASE DETECTED. FOR NRZI, ALL DATA TRACKS DROPPED OUT FOR MORE THAN THREE CHARACTER TIMES BUT FOR LESS THAN .1 INCHES OF TAPE. FOR PE, EIGHT OUT OF NINE DATA TRACKS WENT DEAD FOR LESS THAN .1 INCHES BEFORE A VALID POSTAMBLE WAS DETECTED.
11	NOT USED		
10	DBF	4	DESKEW BUFFER FAIL: THIS BIT IS SET WHEN ONE OF THE DESKEW BUFFERS FAILS TO SET OUTPUT READY WITHIN 20 MICROSECONDS AFTER BEING ENABLED. THE DEAD TRACK BITS INDICATE ON WHICH TRACKS THIS FAILURE OCCURRED.
09	NOT USED		
08	NOT USED		
07	NOT USED		
06	NOT USED		
05	NOT USED		
04	NOT USED		
03	NOT USED		
02	NOT USED		

```
                                        01   UNC    4       UNCORRECTABLE DATA.  SET ON PE  DRIVES  WHEN  A
                                                            PARITY  ERROR  OCCURRED WITHOUT A CORRESPONDING
                                                            DEAD TRACK INDICATION.

                                             CRC    4       CRC ERROR.  SET ON NRZI DRIVES  WHEN  THE  CRC
                                                            CHARACTER WAS FOUND TO BE IN ERROR.

                                        00   MTE    4       MULTI-TRACK ERROR.  SET ON PE DRIVES WHEN  MORE
                                                            THAN ONE DEAD TRACK OCCURRED IN THE PREAMBLE OR
                                                            IN THE DATA FIELD.

                                             VPE    4       VERTICAL PARITY ERROR.  SET ON NRZI DRIVES WHEN
                                                            A  CHARACTER  DID  NOT CONTAIN AN ODD NUMBER OF
                                                            ONE BITS.
```

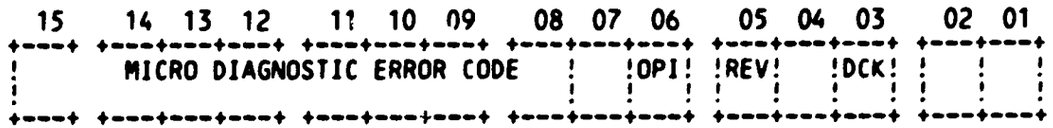
6.3.5 EXTENDED STATUS REGISTER 2 (XSTAT2)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01
OPM	SIP	BPE	CAF		WCF		DTP	DT7	DT6	DT5	DT4	DT3	DT2	DT1

BIT	NAME	TCC	DEFINITION
15	OPM	S	OPERATION IN PROGRESS. (TAPE MOVING)
14	SIP	7,F2	SILO PARITY ERROR. CAUSES FATAL CLASS 2 BECAUSE THE ERROR MIGHT HAVE OCCURRED DURING THE TRANSMISSION OF THE MESSAGE PACKET.
13	BPE	7,F2	SERIAL BUS PARITY ERROR AT DRIVE. SET BY THE TU80 WHEN A PARITY ERROR IS DETECTED ON DATA TRANSMITTED FROM THE ADAPTOR CARD TO THE TU80. CAUSES FA CLASS 2 BECAUSE THE ERROR MIGHT HAVE OCCURRED DURING THE TRANSMISSION OF THE MESSAGE PACKET.
12	CAF	7	CAPSTAN ACCELERATION FAIL. AFTER ACCELERATING TAPE FOR .2 INCHES, THE TAPE SPEED WAS CHECKED AND FOUND TO BE OUT OF TOLERANCE BY MORE THAN 10%.
11	-	-	NOT USED.
10	WCF	7	THE WRITE BOARD IS NOT EMPTYING THE I/O SILO AT THE PROPER RATE. THIS ERROR CAN BE THE RESULT OF THE WRITE BOARD CLOCK NOT BEING TURNED ON (BROKEN HARDWARE).
09	-	-	NOT USED.
08	DTP	S	DEAD TRACK PARITY. THE BITS DTP THROUGH DT0 INDICATE WHICH TRACK(S) WENT DEAD, IF ANY, DURING THE LAST DATA TRANSFER OPERATION. IF DESKEW BUFFER FAIL (DBF) IS SET, THESE BITS INDICATE WHICH CHANNEL FAILED.
07	DT7	S	DEAD TRACK 7. SEE DTP.
06	DT6	S	DEAD TRACK 6. SEE DTP.
05	DT5	S	DEAD TRACK 5. SEE DTP.
04	DT4	S	DEAD TRACK 4. SEE DTP.
03	DT3	S	DEAD TRACK 3. SEE DTP.

```
1649
1650                                    02   DT2    S       DEAD TRACK 2.  SEE DTP.
1651
1652                                    01   DT1    S       DEAD TRACK 1.  SEE DTP.
1653
1654                                    00   DT0    S       DEAD TRACK 0.  SEE DTP.
1655
1656                                NOTE:  ON A SET CHARACTERISTICS COMMAND, THE UCODE LEVEL  IS  RETURNED
1657                                       IN DT7 THRU DT0.  ON A GET STATUS COMMAND, THE RESIDUAL CAPSTAN
1658                                       TICK COUNT (INTERNALLY R7) IS RETURNED IN DT7 THRU DT0.
```

6.3.6 EXTENDED STATUS REGISTER 3 (XSTAT3)



BIT	NAME	TCC	DEFINITION
15 TO 08		7	MICRO DIAGNOSTIC ERROR CODE. THERE IS ONE OPERATIONAL ERROR. 337(8) OR LEFT JUSTIFIED TO 157400(8) IN A 16-BIT REGISTER (CAPSTAN RUNAWAY), WHICH IS DISPLAYED HERE. THIS MEANS THAT THE CAPSTAN WAS COMMANDED TO STOP BUT EXCEEDED THE ALLOWABLE STOPPING WINDOW. DRIVE MUST BE INITIALIZED TO BE USED FOR TAPE MOTION AGAIN.
07	NOT USED		
06	OPI	6	OPERATION INCOMPLETE. SET WHEN A READ, SPACE, OR SKIP OPERATION HAS MOVED 25 FEET OF TAPE WITHOUT DETECTING ANY DATA ON THE TAPE.
05	REV	S	DIRECTION OF CURRENT OPERATION WAS REVERSE (BUT IS 0 IF REWIND OR FORWARD)
04	NOT USED		.
03	DCK	S,6	DENSITY CHECK. SET ON PE DRIVES WHEN A PE IDENTIFICATION BURST WAS NOT DETECTED WHEN MOVING OFF OF BOT. SET ON NRZI DRIVES WHEN A NON-NRZI IDENTIFICATION BURST WAS FOUND WHEN MOVING OFF OF BOT.
02	NOT USED		
01	NOT USED		
00	RIB	2	REVERSE INTO BOT. A READ, SPACE, OR SKIP COMMAND ALREADY IN PROGRESS HAS ENCOUNTERED THE BOT MARKER WHEN MOVING TAPE IN THE REVERSE DIRECTION. TAPE MOTION WILL BE HALTED AT BOT.

&

```
                                .TITLE PROGRAM HEADER AND TABLES
                                .SBTTL  PROGRAM HEADER

                                        .ENABL  ABS,AMA
                        002000  .       =       2000
                                        BGNMOD

                                ;++
                                ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
                                ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
                                ;--

                                        POINTER BGNRPT,BGNSW,BGNSFT,BGNAU,BGNDU,BGNSETUP


                                        HEADER  CZTUV,B,0,5000,1,INTPRI
002000                  L$NAME::                ;DIAGNOSTIC NAME
002000                                                          .ASCII  /C/
002000  103                                                     .ASCII  /Z/
002001  132                                                     .ASCII  /T/
002002  124                                                     .ASCII  /U/
002003  125                                                     .ASCII  /V/
002004  126                                                     .BYTE   0
002005  000                                                     .BYTE   0
002006  000                                                     .BYTE   0
002007  000
002010
002010  102             L$REV::         ;REVISION LEVEL       .ASCII  /B/
002011
002011  060             L$DEPO::        ;0                    .ASCII  /0/
002012
002012  000001          L$UNIT::        ;NUMBER OF UNITS      .WORD   T$PTHV
002014
002014  005000          L$TIML::        ;LONGEST TEST TIME    .WORD   5000
002016
002016  027202          L$HPCP::        ;POINTER TO H.W. QUES.  .WORD L$HARD
002020
002020  027254          L$SPCP::        ;POINTER TO S.W. QUES.  .WORD L$SOFT
002022
002022  002176          L$HPTP::        ;PTR. TO DEF. H.W. PTABLE  .WORD L$HW
002024
002024  002204          L$SPTP::        ;PTR. TO S.W. PTABLE    .WORD L$SW
002026
002026  030670          L$LADP::        ;DIAG. END ADDRESS      .WORD L$LAST
002030
002030  000000          L$STA::         ;RESERVED FOR APT STATS .WORD 0
002032
002032  000000          L$CO::                                  .WORD 0
002034
002034  000001          L$DTYP::        ;DIAGNOSTIC TYPE        .WORD 1
002036
002036  000000          L$APT::         ;APT EXPANSION          .WORD 0
002040
002040  002124          L$DTP::         ;PTR. TO DISPATCH TABLE  .WORD L$DISPAT
002042
002042  000340          L$PRIO::        ;DIAGNOSTIC RUN PRIORITY  .WORD INTPRI
002044                  L$ENVI::        ;FLAGS DESCRIBE HOW IT WAS SETUP
```

```
    (4)  002044  000000                                                .WORD   0
    (5)  002046
    (4)  002046  000000     L$EXP1::        ;EXPANSION WORD            .WORD   0
    (5)  002050
    (4)  002050     003     L$MREV::        ;SVC REV AND EDIT #        .BYTE   C$REVISI
    (3)  002051     003                                                .BYTE   C$EDIT
    (5)  002052
    (4)  002052  000000     L$EF::          ;DIAG. EVENT FLAGS         .WORD   0
    (5)  002054  000000                                                .WORD   0
    (5)  002056             L$SPC::                                    .WORD   0
    (4)  002056  000000     L$DEVP::        ; POINTER TO DEVICE TYPE LIST
    (5)  002060                                                        .WORD   L$DVTYP
    (4)  002060  002166     L$REPP::        ;PTR. TO REPORT CODE       .WORD   L$RPT
    (5)  002062
    (4)  002062  017366     L$EXP4::                                   .WORD   0
    (5)  002064
    (4)  002064  000000     L$EXP5::                                   .WORD   0
    (5)  002066
    (4)  002066  000000     L$AUT::         ;PTR. TO ADD UNIT CODE     .WORD   L$AU
    (5)  002070
    (4)  002070  023246     L$DUT::         ;PTR. TO DROP UNIT CODE    .WORD   L$DU
    (5)  002072
    (4)  002072  023202     L$LUN::         ;LUN FOR EXERCISERS TO FILL
    (5)  002074                                                        .WORD   0
    (4)  002074  000000     L$DESP::        ;POINTER TO DIAG. DESCRIPTION
    (5)  002076                                                        .WORD   L$DESC
    (4)  002076  002140     L$LOAD::        ;GENERATE SPECIAL AUTOLOAD EMT
    (5)  002100                                                        EMT     E$LOAD
    (4)  002100  104035     L$ETP::         ;POINTER TO ERRTBL         .WORD   0
    (5)  002102
    (4)  002102  000000     L$ICP::         ;PTR. TO INIT CODE         .WORD   L$INIT
    (5)  002104
    (4)  002104  021222     L$CCP::         ;PTR. TO CLEAN-UP CODE     .WORD   L$CLEAN
    (5)  002106
    (4)  002106  023140     L$ACP::         ;PTR. TO AUTO CODE         .WORD   L$AUTO
    (5)  002110
    (4)  002110  022516     L$PRT::         ;PTR. TO PROTECT TABLE     .WORD   L$PROT
    (5)  002112
    (4)  002112  021214     L$TEST::        ;TEST NUMBER               .WORD   0
    (5)  002114
    (4)  002114  000000     L$DLY::         ;DELAY COUNT               .WORD   0
    (5)  002116
    (4)  002116  000000     L$HIME::        ;PTR. TO HIGH MEM          .WORD   0
    (5)  002120
    (4)  002120  000000
  1776
```

```
1784
1785
1786
1787
1788
1789
1790
1791  002122                                        .SBTTL  DISPATCH TABLE
 (4)  002122  000006
 (3)  002124                                        ;++
 (6)  002124  023342                                ; THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
 (6)  002126  024730                                ; IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
 (6)  002130  025404                                ;--
 (6)  002132  026042
 (6)  002134  026206        DISPATCH 6              ; SIX TESTS
 (6)  002136  026340                                                    .WORD   6
1792                        L$DISPATCH::
1799                                                                    .WORD   T1
1800                                                                    .WORD   T2
1801                                                                    .WORD   T3
1802                                                                    .WORD   T4
1803                                                                    .WORD   T5
1804                                                                    .WORD   T6
1805
1806  002140                                        .SBTTL  DESCRIPTIVE TEXT
 (4)  002140
 (3)  002140  040504  040524  051040                ;++
 (3)  002146  046105  040511  044502                ;2 LINES OF TEXT PRINTED TO THE OPERATOR TO IDENTIFY THE DIAGNOSTIC AND THE DEVI
 (3)  002154  044514  054524  052040                ;--
 (3)  002162  051505  000124
 (2)                        DESCRIPT        <DATA RELIABILITY TEST>
1807  002166                L$DESC::
 (4)  002166                                                            .ASCIZ  /DATA RE
 (3)  002166  052524  030070      000
 (2)          002174                                                    .EVEN

                            DEVTYP          <TU80>
                            L$DVTYP::
                                                                        .ASCIZ  /TU80/
                                                                        .EVEN
```

```
                                        .SBTTL  DEFAULT HARDWARE P-TABLE

                                        ;++
                                        ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
                                        ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
                                        ; IS IDENTICAL TO THE STRUCTURE OF THE RUN-TIME P-TABLE.
                                        ;--

                                                BGNHW   DFPTBL
 002174                                                                                 .WORD   L10000-L
 (3) 002174  000002
 (3) 002176                             L$HW::
 (3) 002176                             DFPTBL::

 002176  172522                         172522          ;TSSR ADDRESS.
 002200  000224                         224             ;VECTOR ADDRESS.

                                                ENDHW
 002202
 (3) 002202                             L10000:
```

```
                                .SBTTL  SOFTWARE P-TABLE

                                ;++
                                ; THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
                                ; PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
                                ;--
002202                                  BGNSW   SFPTBL
(3) 002202  000043                                                              .WORD   L10001-L
(3) 002204                      L$SW::
(3) 002204                      SFPTBL::
1845 002204     001             CLRFLG::.BYTE   1               ;CLEAR COUNTERS FLAG.
1846 002205     000             RRANV:: .BYTE   0               ;RESET RANDOM VARIABLES EACH PASS FLAG.
1847 002206     000             HAE::   .BYTE   0               ;HALT AFTER EACH COMMAND FLAG.
1848 002207     000             ERCVER::.BYTE   0               ;ENABLE RECOVERABLE ERROR PRINTS FLAG.
1849 002210     000             IREC::  .BYTE   0               ;INHIBIT ERROR RECOVERY FLAG.
1850 002211     001             BADTSW::.BYTE   1               ;BAD TAPE SWITCH TO REWRITE ON SAME SPOT & DETEC
1851 002212     000             DINT::  .BYTE   0               ;DISABLE INTERRUPTS FLAG.
1852 002213     000             PIRE::  .BYTE   0               ;INHIBIT RESIDUAL FRAMECOUNT ERROR REPORT FLAG.
1853 002214     000             RAMWRT::.BYTE   0               ;ENABLE OPTIONAL RAM DUMP
1854 002215     000             CHGFLG::.BYTE   0               ;CHANGE CMD SEQ TABLE FLAG.
1855 002216     000                     .BYTE   0               ;SPARE
1856 002217     000                     .BYTE   0               ;SPARE
1857                                    .EVEN
1858 002220  000040             CHAR::  CH.EAI                  ;CHARACTERISTICS CODE (DEFAULT = 40).
1859 002222  000015             CMDD::  .WORD   13.             ;COMMAND 2 (DEFAULT = REWIND).
1860 002224  000001                     .WORD   1               ;BYTE COUNT
1861 002226  000001                     .WORD   1               ;NUMBER OF OPERATIONS
1862 002230  000007                     .WORD   RANP            ;PATTERN
1863 002232  000004                     .WORD   4               ;COMMAND 3  (DEFAULT = WRITE)
1864 002234  004000                     .WORD   DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
1865 002236  076400                     .WORD   32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32000).
1866 002240  000007                     .WORD   RANP            ;PATTERN (DEFAULT = RANDOM).
1867 002242  000003                     .WORD   3               ;COMMAND 4 (DEFAULT = READ REV).
1868 002244  004000                     .WORD   DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
1869 002246  076400                     .WORD   32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32,000).
1870 002250  000007                     .WORD   RANP            ;PATTERN (DEFAULT = RANDOM).
1871 002252  000002                     .WORD   2               ;COMMAND 5 (DEFAULT = READ FWD).
1872 002254  004000                     .WORD   DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
1873 002256  076400                     .WORD   32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32,000).
1874 002260  000007                     .WORD   RANP            ;PATTERN (DEFAULT = RANDOM).
1875 002262  000015                     .WORD   13.             ;COMMAND 6 (DEFAULT = REWIND).
1876 002264  000001                     .WORD   1.              ;BYTE COUNT
1877 002266  000001                     .WORD   1               ;NUMBER OF OPERATIONS
1878 002270  000007                     .WORD   RANP            ;PATTERN
1879 002272  000033                     .WORD   27.             ;END OF CMD SEQ TABLE CODE (DEF) OR CMD 7
1880 002274  004000                     .WORD   DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
1881 002276  076400                     .WORD   32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32000).
1882 002300  000007                     .WORD   RANP            ;PATTERN (DEFAULT = RANDOM).
1883 002302  000033                     .WORD   27.             ;END OF CMD SEQ TABLE CODE (DEF) OR CMD 8
1884 002304  004000                     .WORD   DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
1885 002306  076400                     .WORD   32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32000).
1886 002310  000007                     .WORD   RANP            ;PATTERN (DEFAULT = RANDOM).
1887 002312                             ENDSW
(3) 002312                      L10001:
1888 002312                             ENDMOD
```

```
                                        .TITLE GLOBAL AREAS
                                        .SBTTL  GLOBAL EQUATES SECTION

002312                                          BGNMOD

                                        ;++
                                        ; THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
                                        ; ARE USED IN MORE THAN ONE TEST.
                                        ;--

002312                                          EQUALS
(1)                                     ;
(1)                                     ; BIT DIFINITIONS
(1)                                     ;
(1)             100000                  BIT15== 100000
(1)             040000                  BIT14== 40000
(1)             020000                  BIT13== 20000
(1)             010000                  BIT12== 10000
(1)             004000                  BIT11== 4000
(1)             002000                  BIT10== 2000
(1)             001000                  BIT09== 1000
(1)             000400                  BIT08== 400
(1)             000200                  BIT07== 200
(1)             000100                  BIT06== 100
(1)             000040                  BIT05== 40
(1)             000020                  BIT04== 20
(1)             000010                  BIT03== 10
(1)             000004                  BIT02== 4
(1)             000002                  BIT01== 2
(1)             000001                  BIT00== 1
(1)                                     ;
(1)             001000                  BIT9==  BIT09
(1)             000400                  BIT8==  BIT08
(1)             000200                  BIT7==  BIT07
(1)             000100                  BIT6==  BIT06
(1)             000040                  BIT5==  BIT05
(1)             000020                  BIT4==  BIT04
(1)             000010                  BIT3==  BIT03
(1)             000004                  BIT2==  BIT02
(1)             000002                  BIT1==  BIT01
(1)             000001                  BIT0==  BIT00
(1)                                     ;
(1)                                     ; EVENT FLAG DEFINITIONS
(1)                                     ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
(1)                                     ;
(1)             000040                  EF.START==      32.                     ; START COMMAND WAS ISSUED
(1)             000037                  EF.RESTART==    31.                     ; RESTART COMMAND WAS ISSUED
(1)             000036                  EF.CONTINUE==   30.                     ; CONTINUE COMMAND WAS ISSUED
(1)             000035                  EF.NEW==        29.                     ; A NEW PASS HAS BEEN STARTED
(1)             000034                  EF.PWR==        28.                     ; A POWER-FAIL/POWER-UP OCCURRED
(1)                                     ;
(1)                                     ;
(1)                                     ; PRIORITY LEVEL DEFINITIONS
(1)                                     ;
(1)             000340                  PRI07== 340
```

```
   (1)          000300                      PRI06== 300
   (1)          000240                      PRI05== 240
   (1)          000200                      PRI04== 200
   (1)          000140                      PRI03== 140
   (1)          000100                      PRI02== 100
   (1)          000040                      PRI01== 40
   (1)          000000                      PRI00== 0
   (1)                                      ;
   (1)                                      ;OPERATOR FLAG BITS
   (1)                                      ;
   (1)          000004                      EVL==        4
   (1)          000010                      LOT==       10
   (1)          000020                      ADR==       20
   (1)          000040                      IDU==       40
   (1)          000100                      ISR==      100
   (1)          000200                      UAM==      200
   (1)          000400                      BOE==      400
   (1)          001000                      PNT==     1000
   (1)          002000                      PRI==     2000
   (1)          004000                      IXE==     4000
   (1)          010000                      IBE==    10000
   (1)          020000                      IER==    20000
   (1)          040000                      LOE==    40000
   (1)          100000                      HOE==   100000
 1921
 1929
 1930                                       ; REGISTER USAGE.
 1931                                       ;
 1932                                       ;       R0 - PASSES PARAMETERS TO/FROM DIAGNOSTIC SUPERVISOR.
 1933                                       ;       R1 - COMMAND SEQUENCE TABLE POINTER.
 1934                                       ;       R2 - GENERAL PURPOSE REGISTER.
 1935                                       ;       R3 - GENERAL PURPOSE REGISTER.
 1936                                       ;       R4 - GENERAL PURPOSE REGISTER.
 1937                                       ;       R5 - CURRENT LOGICAL DEVICE NUMBER X 2.
 1938                                       ;       R6 - STACK POINTER.
 1939                                       ;       R7 - PROGRAM COUNTER.
 1940
 1941                                       ;THE FOLLOWING ARE BIT DEFINITIONS FOR THE TSSR REGISTERS.
 1942
 1943          100000                      TS.SC==100000                   ;SPECIAL CONDITION BIT.
 1944          040000                      TS.UPE==40000                   ;UNIBUS PARITY ERROR
 1945          020000                      TS.SPE==20000                   ;SERIAL BUS PARITY ERROR.
 1946          010000                      TS.RMR==10000                   ;REGISTER MODIFICATION REFUSED.
 1947          004000                      TS.NXM==4000                    ;NON-EXISTENT MEMORY.
 1948          002000                      TS.NBA==2000                    ;NEED BUFFER ADDRESS.
 1949          001000                      TS.A17==1000                    ;BUS ADDRESS BIT 17.
 1950          000400                      TS.A16==400                     ;BUS ADDRESS BIT 16.
 1951          000200                      TS.SSR==200                     ;UNIT READY BIT.
 1952          000100                      TS.OFL==100                     ;OFF LINE.
 1953          177717                      TSC.FCC==177717                 ;FATAL CLASS CODE MASK.
 1954          177761                      TSC.TCC==177761                 ;TERMINATION CLASS CODE MASK.
```

```
1956                                    ;THE FOLLOWING ARE BIT DEFINITIONS FOR THE COMMAND WORD
1957
1958        100000                      ACK.C==100000                   ;ACKNOWLEDGE BIT
1959        040000                      LVC.C==40000                    ;CLEAR VOLUME CHECK.
1960        020000                      OPP.C==20000                    ;OPPOSITE BIT
1961        010000                      SWB.C==10000                    ;SWAP BYTE BIT
1962        004000                      MOD.C3==4000                    ;MODE BIT 3
1963        004000                      BRF.C==4000                     ;BYTE/RECORD/FILE COUNT FLAG BIT.  NOT USED
1964                                                                    ;BY TU80 BUT USED INTERNALLY BY THIS PROGRAM ONL
1965        002000                      MOD.C2==2000                    ;MODE BIT 2
1966        001000                      MOD.C1==1000                    ;MODE BIT 1
1967        000400                      MOD.C0==400                     ;MODE BIT 0
1968        000200                      IE.C==200                       ;INTERRUPT ENABLE
1969        000100                      FMT.C1==100                     ;FORMAT BIT 1
1970        000100                      VFY.C==100                      ;WRITE VERIFY FLAG BIT.  INTERNAL USE ONLY.
1971                                                                    ;NOT USED BY TU80.
1972        000040                      FMT.C0==40                      ;FORMAT BIT 0.
1973        000040                      JMP.C==40                       ;JUMP BIT-TO DIRECT THIS PROGRAM TO JUMP TO
1974                                                                    ;A CERTAIN LOCATION IN THE COMMAND SEQUENCE
1975                                                                    ;TABLE.  INTERNAL USE ONLY.
1976        000020                      CMD.C4==20                      ;COMMAND BIT 4
1977        000020                      DLY.C==20                       ;INSERT DELAY. INTERNAL USE ONLY.
1978        000010                      CMD.C3==10                      ;COMMAND BIT 3
1979        000004                      CMD.C2==4                       ;COMMAND BIT 2
1980        000002                      CMD.C1==2                       ;COMMAND BIT 1
1981        000001                      CMD.C0==1                       ;COMMAND BIT 0
1982
1983                                    ;       BIT DEFINITIONS FOR DEVICE CHARACTERISTICS.
1984
1985        000200                      CH.ESS==200                     ;ENABLE SKIP TAPE MARKS STOP (STOP AT LOGICAL EO
1986        000040                      CH.EAI==40                      ;ENABLE ATTENTION INTERRUPTS.
1987        000020                      CH.ERI==20                      ;ENABLE MESSAGE BUFFER RELEASE INTERRUPTS.
1988        000040                      DFTSCH==CH.EAI                  ;DEFAULT CHARACTERISTICS CODE.
1989
1990                                    ;THE FOLLOWING INDICATES THE RELATIVE POSITIONS OF THE STATUS WORDS
1991                                    ;IN THE MESSAGE BUFFER.
1992
1993        000004                      MS.RFC==4                       ;RESIDUAL FRAME COUNT.
1994        000006                      MS.XS0==6                       ;EXT STATUS REG 0
1995        000010                      MS.XS1==10                      ;EXT STATUS REG 1
1996        000012                      MS.XS2==12                      ;EXT STATUS REG 2
1997        000014                      MS.XS3==14                      ;EXT STATUS REG 3
1998
1999                                    ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 0.
2000
2001        100000                      X0.TMK==100000                  ;TAPE MARK.
2002        040000                      X0.RLS==40000                   ;RECORD LENGTH SHORT.
2003        020000                      X0.LET==20000                   ;LOGICAL EOT.
2004        010000                      X0.RLL==10000                   ;RECORD LENGTH LONG.
2005        000100                      X0.ONL==100                     ;ON LINE BIT.
2006        000002                      X0.BOT==2                       ;BOT BIT.
2007        000001                      X0.EOT==1                       ;EOT BIT.
2008
2009                                    ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 2.
2010
2011        100000                      X2.OPM==100000                  ;OPERATION IN PROGRESS, TAPE MOVING
```

```
2012
2013                                    ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 3.
2014
2015    000010                          X3.DCK==10                      ;DENSITY CHECK.
2016    157400                          X3.RNY==157400                  ;CAPSTAN RUNAWAY UDIAG ERROR CODE.
2017
2018                                    ;THE FOLLOWING DEFINITIONS SHOW THE RELATIVE POSITIONS OF THE COMMAND
2019                                    ;PACKET ENTRIES.
2020
2021    000000                          CP.CMD==0                       ;CMDPKT+0==TU80 COMMAND.
2022    000002                          CP.ADL==2                       ;CMDPKT+2==BUFFER ADDRESS LOW.
2023    000004                          CP.ADH==4                       ;CMDPKT+4==BUFFER ADDRESS HIGH.
2024    000006                          CP.CNT==6                       ;CKDPKT+6==BYTE/FILE/RECORD COUNT
2025
2026                                    ;       MISCELLANEOUS DEFINITIONS.
2027
2028    000340                          INTPRI==PRI07                   ;PRIORITY TO BE USED IN INTERRUPT STATE.
2029    000010                          SCHCNT==10                      ;ARBITRARY BYTE LENGTH FOR CHARACTERISTIC
2030                                                                    ;BUFFER LENGTH. (EVEN #)
2031    000016                          MSGCNT==16                      ;MESSAGE BUFFER LENGTH IN BYTES. (EVEN #)
2032    000020                          DIACNT==20                      ;DIAGNOSTIC COMMAND BUFFER EXTENT.
2033    004000                          DATCNT==2048.                   ;MAXIMUM RECORD LENGTH IN BYTES.
2034                                                                    ;THIS COUNT SHOULD BE A MULTIPLE OF 256 TO INSUR
2035                                                                    ;PROPER READ/WRITE BUFFER ALLOCATION BY THE SUPE
2036    177740                          RNOPSC==177740                  ;RANDOM # OF OPERATIONS MASK.
2037    000007                          RANP==7                         ;CODE TO SELECT RANDOM PATTERN.
2038    000020                          RRECL==16.                      ;READ RECOVERY ATTEMPT LIMIT.
2039    000020                          WRECL==16.                      ;WRITE RECOVERY ATTEMPT LIMIT.
2040    153624                          RANBC==153624                   ;CONSTANT USED TO RESET RANDOM # GENERATOR BASE.
2041    032561                          RANSC==32561                    ;CONSTANT USED TO RESET RANDOM # SAVE LOCATION.
2042    177774                          NINUSE==177774                  ;NOT IN USE CODE FOR DEVICE STATE TABLE.
2043    177740                          NCMD.C==ACK.C!CVC.C!OPP.C!SWB.C!MOD.C3!MOD.C2!MOD.C1!MOD.C0!IE.C!FMT.C1!FMT.C0
2044                                                                    ;NOT "COMMAND" BITS.
2045
2046                                    ;THE FOLLOWING DEFINES THE COMMAND WORD FOR EACH TU80 COMMAND.
2047
2048    100013                          DRI==   ACK.C!CMD.C3!CMD.C1!CMD.C0
2049                                                                    ;DRIVE INIT.
2050
2051    104001                          RDF==   ACK.C!BRF.C!CMD.C0
2052                                                                    ;READ FORWARD
2053
2054    104401                          RDR==   ACK.C!BRF.C!MOD.C0!CMD.C0
2055                                                                    ;READ REVERSE
2056
2057    104005                          WRT==   ACK.C!BRF.C!CMD.C0!CMD.C2
2058                                                                    ;WRITE COMMAND
2059
2060    104105                          WTV==   ACK.C!BRF.C!VFY.C!CMD.C0!CMD.C2
2061                                                                    ;WRITE VERIFY
2062
2063    104010                          SRF==   ACK.C!BRF.C!CMD.C3
2064                                                                    ;SPACE RECORD FORWARD
2065
2066    104410                          SRR==   ACK.C!BRF.C!MOD.C0!CMD.C3
2067                                                                    ;SPACE RECORD REVERSE
```

```
2068
2069          105401                    RNR==   ACK.C!BRF.C!MOD.C1!MOD.C0!CMD.C0
2070                                              ;READ REV RETRY1 - REREAD NEXT REVERSE, IE. SPACE FWD, READ REVE
2071
2072          125401                    RNF==   ACK.C!BRF.C!OPP.C!MOD.C1!MOD.C0!CMD.C0
2073                                              ;READ REV RETRY2 - REREAD NEXT FORWARD, IE.READ FORWARD, SPACE R
2074
2075          105001                    RPF==   ACK.C!BRF.C!MOD.C1!CMD.C0
2076                                              ;READ FWD RETRY1 - REREAD PREVIOUS FORWARD, IE. SPACE REVERSE, R
2077
2078          125001                    RPR==   ACK.C!BRF.C!OPP.C!MOD.C1!CMD.C0
2079                                              ;READ FWD RETRY2 - REREAD PREVIOUS REVERSE, IE. READ REVERSE, SP
2080
2081          105005                    WRR==   ACK.C!MOD.C1!BRF.C!CMD.C2!CMD.C0
2082                                                                    ;WRITE RETRY
2083
2084          102010                    RWD==   ACK.C!MOD.C2!CMD.C3
2085                                                                    ;REWIND COMMAND
2086
2087          100012                    MBR==   ACK.C!CMD.C3!CMD.C1
2088                                                                    ;MESSAGE BUFFER RELEASE
2089
2090          100011                    WTM==   ACK.C!CMD.C3!CMD.C0
2091                                                                    ;WRITE TAPE MARK.
2092
2093          101011                    WTR==   ACK.C!MOD.C1!CMD.C3!CMD.C0
2094                                                                    ;WRITE TAPE MARK RETRY.
2095
2096          105010                    SFF==   ACK.C!BRF.C!MOD.C1!CMD.C3
2097                                                                    ;SPACE FILE FORWARD
2098
2099          105410                    SFR==   ACK.C!BRF.C!MOD.C0!MOD.C1!CMD.C3
2100                                                                    ;SPACE FILE REVERSE
2101
2102          100017                    GES==   ACK.C!CMD.C0!CMD.C1!CMD.C2!CMD.C3
2103                                                                    ;GET EXTENDED STATUS
2104
2105          100411                    ERS==   ACK.C!MOD.C0!CMD.C3!CMD.C0
2106                                                                    ;ERASE 3 INCHES OF TAPE
2107
2108          100412                    UNL==   ACK.C!MOD.C0!CMD.C3!CMD.C1
2109                                                                    ;UNLOAD COMMAND
2110
2111          101012                    CLN==   ACK.C!MOD.C1!CMD.C3!CMD.C1
2112                                                                    ;ERASE TAPE.
2113
2114          140004                    SCH==   ACK.C!CVC.C!CMD.C2      ;SET DEVICE CHARACTERISTICS.
2115
2116          100006                    DIA==   ACK.C!CMD.C2!CMD.C1     ;DIAGNOSTICS.
2117
2118          000040                    JMP==   JMP.C                   ;JUMP TO 'N'TH COMMAND
2119
2120          000020                    DLY==   DLY.C                   ;DELAY 'N' MS.
2121
2122          177777                    END==   177777                  ;END OF COMMAND SEQUENCES
```

```
                                        .SBTTL  GLOBAL DATA SECTION

                                        ;++
                                        ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
                                        ; IN MORE THAN ONE TEST.
                                        ;--

                                        ;       COMMAND PACKET.

                002314                  .       =       .+3&177774      ;MUST BE ON MOD 4 BOUNDRY.
002314  000000                  CMDPKT:: 0              ;1ST WORD IS TU80 COMMAND.
002316  000000                          0               ;2ND WORD IS THE BUFFER LOW ADDRESS.
002320  000000                          0               ;3RD WORD IS THE BUFFER HIGH ADDRESS.
002322  000000                          0               ;4TH WORD IS THE BYTE/RECORD/FILE COUNT.

                                        ;       GET STATUS COMMAND PACKET.

                002324                  .       =       .+3&177774      ;MUST BE ON MOD 4 BOUNDRY.
002324  100017                  GSCPK:: .WORD   GES

                                        ;       MESSAGE BUFFER RELEASE COMMAND PACKET.

                002330                  .       =       .+3&177774      ;MUST BE ON MOD 4 BOUNDRY.
002330  100012                  BRCPK:: .WORD   MBR

                                        ;       REWIND COMMAND PACKET (USED IN ERROR RECOVERY ONLY)

                002334                  .       =       .+3&177774      ;MUST BE ON A MODULE 4 BOUNDARY.
002334  102010                  RWCPK:: .WORD   RWD
002336  000001                          .WORD   1

                                        ;       WORK AREA FOR ANALYSIS OF MESSAGE PACKET CONTENTS.

002340  000007                  MSGPKT:: .BLKW  7               ;1ST WORD:: MESSAGE TYPE.
                                                                ;2ND WORD:: DATA FIELD LENGTH.
                                                                ;3RD WORD:: RESIDUAL FRAME COUNT.
                                                                ;4TH WORD:: XSTAT0
                                                                ;5TH WORD:: XSTAT1
                                                                ;6TH WORD:: XSTAT2
                                                                ;7TH WORD:: XSTAT3

                                        ;       MESSAGE PACKETS

002356  000007                  MSGPK0:: .BLKW  7               ;MESSAGE PACKET FOR DEVICE #0
002374  000007                  MSGPK1:: .BLKW  7               ;MESSAGE PACKET FOR DEVICE #1
002412  000007                  MSGPK2:: .BLKW  7               ;MESSAGE PACKET FOR DEVICE #2
002430  000007                  MSGPK3:: .BLKW  7               ;MESSAGE PACKET FOR DEVICE #3
```

```
                                        ;       SET CHARACTERISTIC BLOCK.
                                        ;
002446  002356                          SCHBK:: MSGPK0                  ;1ST WORD:: MSGPKT ADDR LO(SET UP BY EXCUTE ROUT
002450  000000                                  0                       ;2ND WORD:: MSGPKT ADDR HI.
002452  000016                                  MSGCNT                  ;3RD WORD:: MSG BUFFER LENGTH (BYTES)
002454  000040                                  CH.EAI                  ;4TH WORD:: CHARACTERISTICS WORD(SET BY SETUP RO
                                        ;
                                        ;       TU80 REGISTER ADDRESSES.
                                        ;
002456  000004                          TSDB::  .BLKW   4               ;TU80 DATA BUFFER ADDRESSES.
002466  000004                          TSSR::  .BLKW   4               ;TU80 STATUS REGISTER ADDRESSES.
002476  000004                          TSVCT:: .BLKW   4               ;TU80 VECTOR ADDRESSES.
        002456                          TSBA==TSDB                      ;DATA BUFFER ADDRESS REGISTER.
                                        ;
                                        ;       ADDRESSES OF MESSAGE PACKETS.
                                        ;
002506  002356                          MSGPKA:: MSGPK0                 ;DEVICE 0.
002510  002374                                   MSGPK1                 ;DEVICE 1.
002512  002412                                   MSGPK2                 ;DEVICE 2.
002514  002430                                   MSGPK3                 ;DEVICE 3.
                                        ;
                                        ;       ADDRESSES OF INTERRUPT HANDLING ROUTINES.
                                        ;
002516  006566                          TS4INT:: TS4IN0                 ;DEVICE 0.
002520  006574                                   TS4IN1                 ;DEVICE 1.
002522  006602                                   TS4IN2                 ;DEVICE 2.
002524  006610                                   TS4IN3                 ;DEVICE 3.
                                        ;
                                        ;       TU80 CODE LEVELS, WILL BE STORED AFTER SCH CMD IN BASIC FUNCTION TEST
                                        ;
002526  000000                          TS4CL:: 0                       ;DEVICE 0
002530  000000                                  0                       ;DEVICE 1
002532  000000                                  0                       ;DEVICE 2
002534  000000                                  0                       ;DEVICE 3
                                        ;
                                        ;       UNIT NUMBERS OF ALL DEVICES BEING TESTED(1-4).
                                        ;       WHEN DEVICE IS NOT IN USE, IT,S LOCATION WILL = -3.
                                        ;       R5 WILL ALWAYS CONTAIN THE PRESENT LOGICAL UNIT NUMBER X 2.
                                        ;
002536  177774                          DEVTBL:: .WORD  NINUSE
002540  177774                                   .WORD  NINUSE
002542  177774                                   .WORD  NINUSE
002544  177774                                   .WORD  NINUSE
002546  177777                                   .WORD  END
                                        ;
                                        ;       BAD TAPE TABLE POINTER: USED BY WRITE RETRY ROUTINE
                                        ;       "WRTY" TO LOG BAD TAPE SPOTS ON UNITS UNDER TEST
                                        ;
002550  003000                          BTADDR:: BT0
002552  003052                                   BT1
002554  003124                                   BT2
002556  003176                                   BT3
```

```
2226                                    ;       COUNTER AREA.
2227
2228            002560                  CNTBGN=.
2229  002560   000020                   WRBC::  .BLKW   20              ;BYTES WRITTEN.
2230  002620   000020                   RRBC::  .BLKW   20              ;BYTES READ REV.
2231  002660   000020                   RFBC::  .BLKW   20              ;BYTES READ FWD.
2232  002720   000004                   WRREC:: .BLKW   4               ;RECOVERABLE WRITE ERRORS.
2233  002730   000004                   WRUNR:: .BLKW   4               ;UNRECOVERABLE WRITE ERRORS.
2234  002740   000004                   RRREC:: .BLKW   4               ;RECOVERABLE READ REV ERRORS.
2235  002750   000004                   RRUNR:: .BLKW   4               ;UNRECOVERABLE READ REV ERRORS.
2236  002760   000004                   RFREC:: .BLKW   4               ;RECOVERABLE READ FWDERRORS.
2237  002770   000004                   RFUNR:: .BLKW   4               ;UNRECOVERABLE READ FWD ERRORS.
2238  003000   000025                   BT0::   .BLKW   21.             ;UNIT 0 BAT TAPE SPOTS LOG
2239  003052   000025                   BT1::   .BLKW   21.             ;UNIT 1 BAT TAPE SPOTS LOG
2240  003124   000025                   BT2::   .BLKW   21.             ;UNIT 2 BAT TAPE SPOTS LOG
2241  003176   000025                   BT3::   .BLKW   21.             ;UNIT 3 BAT TAPE SPOTS LOG
2242  003250   000004                   WRTYCT:: .BLKW  4               ;WRITE RETRY COUNTER
2243  003260   000004                   PASCNT:: .BLKW  4               ;PASS COUNT.
2244  003270   000004                   SCCNT:: .BLKW   4               ;SPECIAL CONDITION COUNT.
2245  003300   000004                   VFYCNT:: .BLKW  4               ;COUNT OF TU80 DATA COMPARE ERRORS.
2246  003310   000004                   HRDCNT:: .BLKW  4               ;COUNT OF HARD ERRORS.
2247  003320   000004                   FTLCNT:: .BLKW  4               ;COUNT OF FATAL ERRORS.
2248            003330                  CNTEND=.                        ;END OF STATICTICAL COUNTERS.
2249  003330   000004                   RECCNT:: .BLKW  4               ;NUMBER OF RECORDS FROM BOT: CLEARED  ON REWIND
2250                                                                    ;AND WHEN RESTARTING OR CONTINUING TEST 2.
2251            000550                  CNTLEN==CNTEND-CNTBGN           ;LENGTH OF STATISTICAL COUNTER AREA.
2252
2253                                    ;       THE FOLLOWING ARE THE DEFINITIONS OF VARIABLES
2254                                    ;       USED BY THE PROGRAM.
2255
2256  003340      000                   DOAGIN:: .BYTE  0               ;TEST 3 LOOP CONTROL
2257  003341      000                   HERE::   .BYTE  0               ;THIS IS A "BEEN HERE BEFORE" MARKER
2258                                    .EVEN
2259  003342   000000                   RAMHLD:  .WORD  0               ;RAM ADDR HOLDER 1ST ADDRESS
2260  003344   000000                   RAMR5H:  .WORD  0               ;HOLDS R5 FOR LATER
2261  003346   000020                   RAMDATA::.BLKW  16.             ;DATA READ FROM RAM PACKET OR MESSAGE BUF AREA
2262  003406   000000                   RAMSIZ:: .WORD  0               ;RAM DATA SIZE FOR PRAMPKT ROUTINE
2263  003410   000000                   CMPDAT:: .WORD  0               ;COUNTS # OF READS (TEST 3) BEFORE ALLOWING A DA
2264  003412   000000                   DATRAT:: .WORD  0               ;CONTROLS THE DATA COMPARE RATIO
2265  003414   000000                   STTIM::  .WORD  0               ;BTL
2266  003416   000000                   DATAWT:: .WORD  0               ;WRITE BUFFER ADDRESS.
2267  003420   000000                   DATARD:: .WORD  0               ;READ BUFFER ADDRESS.
2268  003422   000000                   NCNT::   .WORD  0               ;STORAGE FOR VALUE OF N.
2269  003424   000000                   NCNT1::  .WORD  0               ;TEMP STORAGE FOR VALUE OF N.
2270  003426   000000                   BRFCNT:: .WORD  0               ;STORAGE FOR BPCR VALUE.
2271  003430   177777                   CMDWRD:: .WORD  END             ;CONTAINS COMMAND WORD BEING EXECUTED PRESENTLY.
2272  003432   177777                   CMDSAV:: .WORD  END             ;SAVE LOCATION FOR CMD WORD DURING ERROR RECOVER
2273  003434   177777                   PCMDWD:: .WORD  END             ;CONTAINS PREVOUS COMMAND WORD.
2274  003436   000000                   CMDLG::  .WORD  0               ;CURRENT COMMAND LOGGING CODE.
2275  003440   000000                   LENMSK:: .WORD  0               ;RANDOM WRITE LENGTH MASK, TO BE SET UP BY TESTS
2276  003442   153624                   RANB::   .WORD  153624          ;RANDOM # GENERATOR BASE.
2277  003444   032561                   RANS::   .WORD  32561           ;RANDOM # SAVE LOCATION.
2278  003446   000000                   TIME1::  .WORD  0               ;TIME COUNT 1.
2279  003450   000000                   TIME2::  .WORD  0               ;TIME COUNT 2.
2280  003452   000000                   JLOOP::  .WORD  0               ;JMP COMMAND LOOP COUNT.
2281  003454   000000                   JLOC::   .WORD  0               ;JMP COMMAND LOCATION COUNT.
```

```
  2282  003456  000000                    PATERN:: .WORD  0               ;PATTERN SELECT CODE.
```

```
2284  003460  000000                  CTCL::   .WORD  0              ;CURRENT TERMINATION CLASS CODE.
2285  003462  000000                  R5SAVE:: .WORD  0              ;LOCATION FOR SAVING CURRENT DEVICE POINTER.
2286  003464  000000                  TSSREG:: .WORD  0              ;CURRENT STATUS REGISTER.
2287          003416                  DIABLK==DATAWT                 ;WRITE BUFFER ALSO USED FOR DIAG CMD.
2288
2289                                  ;       ERROR FLAG AREA, THESE FLAGS ARE CLEARED DURING INITIALIZATION AND
2290                                  ;       AFTER EACH COMMAND IS COMPLETED.
2291
2292          003466                  BGNFLG=.
2293  003466  000000                  RETRYC:: .WORD  0              ;# OF RECOVERY ATTEMPTS EXECUTED.
2294  003470     000                  RPTCNT:: .BYTE  0       ;WRITE REPEAT ON SAME SPOT CNTR: 4 PER WRITE RETRY
2295  003471     000                  WRTYFG:: .BYTE  0              ;WRITE RETRY ON SAME SPOT IN PROGRESS FLAG
2296  003472     000                  WRTYER:: .BYTE  0              ;WRITE RETRY ON SAME SPOT ERROR FLAG
2297  003473     000                  RECLOG:: .BYTE  0              ;RECORD COUNT HAS BEEN UPDATED FOR THIS RECORD.
2298  003474     000                  ERLOG::  .BYTE  0              ;DATA BYTES AND ERRORS HAVE BEEN LOGGED FOR THIS
2299  003475     000                  RWERR::  .BYTE  0              ;READ/WRITE ERROR HAS OCCURED.
2300  003476     000                  UNREC::  .BYTE  0              ;UNRECOVERABLE ERROR HAS OCCURED.
2301  003477     000                  ERRREC:: .BYTE  0              ;ERROR RECOVERY MODE.
2302                                          .EVEN
2303          003500                  ENDERF=.
2304
2305                                  ;       ADDITIONAL FLAGS, THESE FLAGS ARE CLEARED DURING INITIALIZATION.
2306
2307  003500  000004                  INTFLG:: .BLKW  4              ;INTERRUPT OCCURRED FLAGS FOR EACH DEVICE.
2308  003510  000004                  EOTFLG:: .BLKW  4              ;EOT/BOT FLAGS FOR EACH DEVICE (XSTAT0).
2309  003520  000000                  BTPT::   .WORD  0              ;BAD TAPE SPOT POINTER TO BT0-BT3 VIA BTADDR
2310  003522     000                  EXPBOT:: .BYTE  0              ;BOT IS EXPECTED, DO NOT ABORT ON BOT/FUNC RTI.
2311  003523     000                  RANDOM:: .BYTE  0              ;RANDOM EVERYTHING FLAG.
2312  003524     000                  VFYFLG:: .BYTE  0              ;SET DURING WRITE/VERIFY COMMAND.
2313  003525     000                  RPTFLG:: .BYTE  0              ;PERFORMANCE REPORT HAS BEEN REQUESTED.
2314  003526     000                  SWBFLG:: .BYTE  0              ;ENABLES SWAP BYTE FUNCTION WHEN NOT EQUAL TO ZE
2315  003527     000                  IRE::    .BYTE  0              ;INHIBIT RESIDUAL FRAME COUNT ERROR REPORT.
2316  003530     000                  DROPED:: .BYTE  0              ;CURRENT UNIT HAS BEEN DROPPED
2317  003531     000                  T1SWB::  .BYTE  0              ;TEST1 SWAP BYTES FLAG
2318  003532     000                  ALLEOT:: .BYTE  0              ;ALL UNITS @ EOT FLAG
2319  003533     000                  STREAM:: .BYTE  0              ;INDICATES TEST ONE UNIT AT A TIME, COMPLETELY.
2320  003534     000                  ERSFLG:. .BYTE  0              ;ERASE FLAG:  DO ERASE AFTER A SPACE REV TO DELE
2321                                                                 ;BADLY WRITTEN RECORD.  1 TO 4 ERASES LEAVING
2322                                                                 ;A 3 TO 12 INCH GAP MAY RESULT.
2323          003536                          .EVEN
2324          003536                  ENDFLG=.
2325
2326                                  ;       ADDITIONAL FLAGS, THESE FLAGS ARE CLEARED ONLY AFTER BEING CHECKED.
2327
2328  003536     000                  STAFLG:: .BYTE  0              ;START FLAG - SET BY INIT CODE IF STARTING.
2329  003537     000                  PWRFLG:: .BYTE  0              ;POWER FAILURE FLAG - SET ONLY DURING INIT.
2330  003540     000                  TRAPD4:: .BYTE  0              ;TRAPED AT 4 FLAG
2331  003541     000                  MISCFG:: .BYTE  0              ;MISCELLANEOUS FLAG
2332
```

```
2334                                    ;       OPERATOR FLAG SETTINGS PASSED BY DIAG. SUPERVISOR IN A 16 BIT WORD
2335                                    ;       SEE GLOBAL EQUATES SECTION FOR FLAG BIT LIST
2336
2337  003542  000000                    OPFLAG:: .WORD  0       ;READ ONLY OPERATOR FLAG WORD
2338                                            .EVEN
2339
2340                                            ;THE FOLLOWING IS THE COMMAND SEQUENCE TABLE.  THE TABLE
2341                                            ;HAS DEFAULT VALUES AT PROGRAM LOAD AS SHOWN.  THESE VALUES
2342                                            ;CAN BE UPDATED BY A TEST OR BY OPERATOR INPUT.
2343
2344  003544  140004                    CMDSEQ:: .WORD  SCH             ;SET CHARACTERISTICS.
2345  003546  000040                            .WORD   CH.EAI
2346  003550  000001                            .WORD   1
2347  003552  000000                            .WORD   0
2348  003554  102010                    CMDSE2:: .WORD  RWD             ;REWIND.
2349  003556  000001                            .WORD   1               ;BYTE COUNT.
2350  003560  000001                            .WORD   1               ;ONCE.
2351  003562  000007                            .WORD   RANP            ;PATTERN.
2352  003564  104005                            .WORD   WRT             ;WRITE.
2353  003566  004000                            .WORD   DATCNT          ;MAX BUFFER LENGTH.
2354  003570  076400                            .WORD   32000.          ;32,000 RECORDS.
2355  003572  000007                            .WORD   RANP            ;RANDOM PATTERN.
2356  003574  104401                            .WORD   RDR             ;READ REV.
2357  003576  004000                            .WORD   DATCNT          ;MAX BUFFER LENGTH.
2358  003600  076400                            .WORD   32000.          ;32,000 RECORDS
2359  003602  000007                            .WORD   RANP            ;RANDOM PATTERN.
2360  003604  104001                            .WORD   RDF             ;READ FWD.
2361  003606  004000                            .WORD   DATCNT          ;MAX BUFFER LENGTH.
2362  003610  076400                            .WORD   32000.          ;32,000 RECORDS.
2363  003612  000007                            .WORD   RANP            ;RANDOM PATTERN.
2364  003614  102010                            .WORD   RWD             ;REWIND.
2365  003616  000001                            .WORD   1               ;BYTE COUNT.
2366  003620  000001                            .WORD   1               ;ONCE.
2367  003622  000007                            .WORD   RANP            ;PATTERN.
2368  003624  000004                            .BLKW   4               ;EXTENSTION TO HOLD 1 MORE CMD.
2369  003634  177777                    SEQEND:: .WORD  END             ;SOFT END OF SEQUENCE TABLE.
2370  003636  177777                            .WORD   END
2371  003640  177777                            .WORD   END
2372  003642  177777                            .WORD   END
2373  003644  177777                            .WORD   END             ;HARD END OF SEQUENCE TABLE.
```

```
 2375                                                ;THE FOLLOWING IS THE TU80 COMMAND TABLE
 2376
 2377  003646  100013                    CMDTBL:: .WORD   DRI            ;DRIVE INIT.
 2378  003650  104001                             .WORD   RDF            ;READ FORWARD.
 2379  003652  104401                             .WORD   RDR            ;READ REVERSE.
 2380  003654  104005                             .WORD   WRT            ;WRITE
 2381  003656  104105                             .WORD   WTV            ;WRITE/VERIFY.  (WRITE ALL RECORDS, RDR AND
 2382                                                                    ;CHECK DATA ON ALL RECORDS, RDF AND
 2383                                                                    ;CHECK DATA ON ALL RECORDS.)
 2384  003660  104010                             .WORD   SRF            ;SPACE 'N' RECORDS FORWARD.
 2385  003662  104410                             .WORD   SRR            ;SPACE 'N' RECORDS REVERSE.
 2386  003664  105401                             .WORD   RNR            ;READ NEXT REVERSE. I.E., SPACE FWD, READ REVERS
 2387  003666  125401                             .WORD   RNF            ;READ NEXT FORWARD, I.E., READ FORWARD, SPACE RE
 2388  003670  105001                             .WORD   RPF            ;READ PREVIOUS FORWARD. I.E., SPACE REVERSE, REA
 2389  003672  125001                             .WORD   RPR            ;READ PREVIOUS REVERSE. I.E., READ REVERSE, SPAC
 2390  003674  105005                             .WORD   WRR            ;WRITE RETRY.
 2391  003676  102010                             .WORD   RWD            ;REWIND.
 2392  003700  100012                             .WORD   MBR            ;MESSAGE BUFFER RELEASE
 2393  003702  100011                             .WORD   WTM            ;WRITE TAPE MARK
 2394  003704  101011                             .WORD   WTR            ;WRITE TAPE MARK RETRY.
 2395  003706  105010                             .WORD   SFF            ;SPACE 'N' FILES FORWARD.
 2396  003710  105410                             .WORD   SFR            ;SPACE 'N' FILES REVERSE.
 2397  003712  100017                             .WORD   GES            ;GET EXTENDED STATUS.
 2398  003714  100411                             .WORD   ERS            ;ERASE 3 INCHES OF TAPE.
 2399  003716  100412                             .WORD   UNL            ;REWIND AND UNLOAD.
 2400  003720  101012                             .WORD   CLN            ;CLEAR TAPE.
 2401  003722  140004                             .WORD   SCH            ;SET CHARACTERISTICS.
 2402  003724  100006                             .WORD   DIA            ;DIAGNOSTIC COMMAND.
 2403  003726  000040                             .WORD   JMP            ;JUMP TO THE NTH COMMAND IN THE SEQUENCE.
 2404  003730  000020                             .WORD   DLY            ;DELAY 'N' MS.
 2405  003732  177777                             .WORD   END            ;END OF COMMAND TABLE
 2406
```

```
2408                                    ;       THE FOLLOWING TABLE CONTAINS THE ASCII FOR EACH COMMAND.
2409
2410  003734  051104     111      CMDASC:: .ASCII /DRI/          ;DRIVE INIT.
2411  003737     122  043104              .ASCII  /RDF/          ;READ FORWARD.
2412  003742  042122     122              .ASCII  /RDR/          ;READ REVERSE.
2413  003745     127  052122              .ASCII  /WRT/          ;WRITE
2414  003750  052127     126              .ASCII  /WTV/          ;WRITE/VERIFY.  (WRITE ALL RECORDS, RDR AND CHEC
2415                                                             ;ON ALL RECORDS, RDF AND CHECK DATA ON ALL RECOR
2416  003753     123  043122              .ASCII  /SRF/          ;SPACE 'N' RECORDS FORWARD.
2417  003756  051123     122              .ASCII  /SRR/          ;SPACE 'N'  RECORDS REVERSE.
2418  003761     122  051116              .ASCII  /RNR/          ;READ NEXT REVERSE. I.E., SPACE FWD READ REVERSE
2419  003764  047122     106              .ASCII  /RNF/          ;READ NEXT FORWARD, I.E., READ FORWARD, SPACE RE
2420  003767     122  043120              .ASCII  /RPF/          ;READ PREVIOUS FORWARD. IE., SPACE REVERSE, READ
2421  003772  050122     122              .ASCII  /RPR/          ;READ PREVIOUS REVERSE. IE., READ REVERSE, SPACE
2422  003775     127  051122              .ASCII  /WRR/          ;WRITE RETRY.
2423  004000  053522     104              .ASCII  /RWD/          ;REWIND.
2424  004003     115  051102              .ASCII  /MBR/          ;MESSAGE BUFFER RELEASE
2425  004006  052127     115              .ASCII  /WTM/          ;WRITE TAPE MARK
2426  004011     127  051124              .ASCII  /WTR/          ;WRITE TAPE MARK RETRY.
2427  004014  043123     106              .ASCII  /SFF/          ;SPACE 'N' FILES FORWARD.
2428  004017     123  051106              .ASCII  /SFR/          ;SPACE 'N' FILES REVERSE.
2429  004022  042507     123              .ASCII  /GES/          ;GET EXTENDED STATUS.
2430  004025     105  051522              .ASCII  /ERS/          ;ERASE 3 INCHES OF TAPE.
2431  004030  047125     114              .ASCII  /UNL/          ;REWIND AND UNLOAD.
2432  004033     103  047114              .ASCII  /CLN/          ;CLEAN TAPE.
2433  004036  041523     110              .ASCII  /SCH/          ;SET CHARACTERISTICS.  WHERE BRF=200, 40, 20, 0.
2434                                                             ;SEE TU80 PROGRAMMING SPECIFICATION FOR DESCRIPT
2435  004041     104  040511              .ASCII  /DIA/          ;DIAGNOSTICS.  SEE TU80 PROGRAMMING SPECIFICATIO
2436                                                             ;FOR DESCRIPTION.  ODT MUST BE USED TO LOAD DIAG
2437                                                             ;INTO THE WRITE BUFFER BEFORE THIS CMD IS ISSUED
2438  004044  046512     120              .ASCII  /JMP/          ;JUMP TO THE NTH COMMAND IN THE COMMAND
2439                                                             ;SEQUENCE TABLE, WHERE N IS DEFINED IN
2440                                                             ;THE # OF OPERATIONS.
2441  004047     104  054514              .ASCII  /DLY/          ;DELAY 'N' MS, WHERE N IS DEFINED IN
2442                                                             ;THE # OF OPERATIONS.
2443  004052  047105     104              .ASCII  /END/          ;END OF COMMAND SEQUENCE.
2444          004056                      .EVEN
2445
2446
2447
```

```
                                        .SBTTL  GLOBAL TEXT SECTION

                                        ;++
                                        ; THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
                                        ; MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
                                        ; MORE THAN ONE TEST.
                                        ;--



                                        ;
                                        ; FORMAT STATEMENTS USED IN PRINT CALLS
                                        ;

                                                .NLIST  BEX

004056  047045  040445  047125          CODELM:: .ASCIZ /%N%AUNIT %D1%A TU80 CODE LEVEL P%03%N%N/
                                                .EVEN
004126  054130  020130  046503          HALTM:: .ASCIZ  /XXX CMD - TYPE <CR> TO CONTINUE/
004166  046503  020104  040520          CMDPKM:: .ASCIZ /CMD PACKET ADR NOT ON MODULO 4 BOUNDARY: RELOAD!/
        004250                                  .EVEN
004250  040504  040524  041440          WTVERM:: .ASCIZ /DATA COMPARE ERROR/
004273     116  020117  052524          TOERM:: .ASCIZ  /NO TU80 RESPONSE/
004314  047125  042504  044506          SCERM:: .ASCIZ  /UNDEFINED SPEC COND/
004340  043122  020103  047516          RFCERM:: .ASCIZ /RFC NON ZERO/
004355     124  034125  020060          NSSRM:: .ASCIZ  /TU80 NOT READY/
004374  042522  051124  020131          RLEXM:: .ASCIZ  /RETRY LIMIT EXCEEDED/
004421     125  044516  020124          ATTNM:: .ASCIZ  /UNIT OFF LINE/
004437     106  047125  052103          FUNRM:: .ASCIZ  /FUNCTION REJECT/
004457     106  052101  046101          FATSM:: .ASCIZ  /FATAL SUBSYSTEM ERROR/
004505     116  020117  047111          NOINTM:: .ASCIZ /NO INTERRUPT/
004522  040524  042520  051440          TSAM::  .ASCIZ  /TAPE STATUS ALERT/
004544  047524  020117  040515          TOOMM:: .ASCIZ  /TOO MANY INTERRUPTS/
004570  040503  051520  040524          RNYM::  .ASCIZ  /CAPSTAN RUNAWAY-GET STATUS RESULTS:/
004634  042522  047503  042526          RERM::  .ASCIZ  /RECOVERABLE ERROR/
004656  047125  042522  047503          URERM:: .ASCIZ  /UNRECOVERABLE ERROR/
004702  047045  040445  051104          DROPDM:: .ASCIZ /%N%ADROPPED UNIT %D1%N/
004731     045  022516  040501          AUDRPM:: .ASCIZ /%N%AALL UNITS DROPPED%N%N/
004763     045  022516  041101          DTAER2:: .ASCIZ "%N%ABYTE:%D4%S2%AWAS:%B8%S2%AS/B:%B8%N"
005032  042045  022464  020101          DTAER3:: .ASCIZ "%D4%A BYTES IN ERROR OUT OF %D4%N"
005074  040445  047516  042040          DTAER4:: .ASCIZ /%ANO DATA READ%N/
005115     045  051101  041505          DTAER5:: .ASCIZ /%ARECORD TOO LONG: >%04%A BYTES%N/
005157     045  051101  041505          NURTY1:: .ASCIZ /%ARECOVERED ON RETRY #%D2%N/
005213     045  052501  044516          OFLINM:: .ASCIZ /%AUNIT %D1%A OFF LINE%N/
005243     045  043501  052105          GETSTM:: .ASCIZ /%AGET STATUS CMD RESULTS:%N/
005277     045  000116                  CRLF::  .ASCIZ  /%N/
005302  047045  051445  000067          CRLFSP:: .ASCIZ /%N%S7/
005310  047045  040445  025040          RAMFHR: .ASCIZ  '%N%A ********** SPECIAL M7454 RAM MEMORY DUMP **********'
005401     045  022516  020101          RAMIOP: .ASCIZ  '%N%A RAM ADDRESS (OCTAL) = %03%A - %03%N'
005452  040445  022440  031517          RAMPD:  .ASCIZ  '%A %03%A '
005464  047045  047045  047045          RAMLIN: .ASCIZ  '%N%N%N'
                                                .LIST   BEX
        005474                                  .EVEN
```

```
2509                                    .SBTTL  GLOBAL ERROR REPORT SECTION
2510
2511                                    ;++
2512                                    ; THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINTB AND PRINTX CALLS
2513                                    ; THAT ARE USED IN MORE THAN ONE TEST.  IT ALSO INCLUDES THE ASCII MESSAGES
2514                                    ; THAT ARE USED BY THE PRINTB AND PRINTX CALLS..
2515                                    ;--
2516
2517
2518  005474                            BGNMSG  DTAERM
  (3) 005474                        DTAERM::
2524  005474                            PRINTB  #STAER1,DEVTBL(R5),PASCNT(R5),PECCNT(R5)
 (10) 005474  016546  003330                                                    MOV     RECCNT(R
 (9)  005500  016546  003260                                                    MOV     PASCNT(R
 (8)  005504  016546  002536                                                    MOV     DEVTBL(R
 (7)  005510  012746  006154                                                    MOV     #STAER1,
 (6)  005514  012746  000004                                                    MOV     #4,-(SP)
 (3)  005520  010600                                                            MOV     SP,R0
 (4)  005522  104414                                                            TRAP    C$PNTB
 (4)  005524  062706  000012                                                    ADD     #12,SP
2525  005530                            PRINTB  #STAER7
 (7)  005530  012746  006246                                                    MOV     #STAER7,
 (6)  005534  012746  000001                                                    MOV     #1,-(SP)
 (3)  005540  010600                                                            MOV     SP,R0
 (4)  005542  104414                                                            TRAP    C$PNTB
 (4)  005544  062706  000004                                                    ADD     #4,SP
2526  005550                            LET RECRED := R2                ;SAVE R2
 (4)  005550  010237  006562                                                    MOV     R2,RECRE
2527  005554                            LET TIME1 := R3                 ;SAVE R3
 (4)  005554  010337  003446                                                    MOV     R3,TIME1
2528  005560                            LET TIME2 := R4                 ;SAVE R4
 (4)  005560  010437  003450                                                    MOV     R4,TIME2
2529  005564  004737  006616           JSR PC,RECTAP                   ;RETRIEVE RECORD READ
2530  005570                            LET R2 := RECRED                ;RESTORE R2
 (4)  005570  013702  006562                                                    MOV     RECRED,R
2531  005574                            LET RECRED := R3                ;SAVE RECORD READ
 (4)  005574  010337  006562                                                    MOV     R3,RECRE
2532  005600                            LET R3 := TIME1                 ;RESTORE R3
 (4)  005600  013703  003446                                                    MOV     TIME1,R3
2533  005604                            LET R4 := TIME2                 ;RESTORE R4
 (4)  005604  013704  003450                                                    MOV     TIME2,R4
2534  005610                            PRINTB  #STAER6,RECRED          ;PRINT RECORD READ
 (8)  005610  013746  006562                                                    MOV     RECRED,-
 (7)  005614  012746  006276                                                    MOV     #STAER6,
 (6)  005620  012746  000002                                                    MOV     #2,-(SP)
 (3)  005624  010600                                                            MOV     SP,R0
 (4)  005626  104414                                                            TRAP    C$PNTB
 (4)  005630  062706  000006                                                    ADD     #6,SP
2535  005634                            EXIT    MSG
 (4)  005634  000167                                                            .WORD   J$JMP
 (3)  005636  000000                                                            .WORD   L10002-2
2536
2537
2538  005640                            .EVEN
 (3)  005640                            ENDMSG
                                    L10002:
 (3)  005640  104423                                                            TRAP    C$MSG
```

```
 2539
 2540  005642                                  BGNMSG  STAERM
   (3) 005642                          STAERM::
 2541  005642                                  PRINTB  #STAER1,DEVTBL(R5),PASCNT(R5),RECCNT(R5)
  (10) 005642  016546  003330                                                    MOV     RECCNT(R
   (9) 005646  016546  003260                                                    MOV     PASCNT(R
   (8) 005652  016546  002536                                                    MOV     DEVTBL(R
   (7) 005656  012746  006154                                                    MOV     #STAER1,
   (6) 005662  012746  000004                                                    MOV     #4,-(SP)
   (3) 005666  010600                                                            MOV     SP,R0
   (4) 005670  104414                                                            TRAP    C$PNTB
   (4) 005672  062706  000012                                                    ADD     #12,SP
 2542  005676                                  PRINTB  #STAER7
   (7) 005676  012746  006246                                                    MOV     #STAER7,
   (6) 005702  012746  000001                                                    MOV     #1,-(SP)
   (3) 005706  010600                                                            MOV     SP,R0
   (4) 005710  104414                                                            TRAP    C$PNTB
   (4) 005712  062706  000004                                                    ADD     #4,SP
 2543  005716                                  LET R2 := CMDPKT CLR.BY #177740
   (4) 005716  013702  002314                                                    MOV     CMDPKT,R
   (6) 005722  042702  177740                                                    BIC     #177740,
 2544  005726                                  LET R2 := R2 - #1
   (6) 005726  005302                                                            DEC     R2
 2545  005730                                  IF R2 EQ #0 THEN                ;IF CMD IS A READ
   (6) 005730  005702                                                            TST     R2
   (9) 005732  001016                                                            BNE     50000$
 2546  005734  004737  006616                    JSR PC,RECTAP                 ;THEN RETRIEVE
 2547  005740                                    LET RECRED := R3              ;AND
   (4) 005740  010337  006562                                                    MOV     R3,RECRE
 2548  005744                                    PRINTB #STAER6,RECRED         ;TYPE RECORD READ
   (8) 005744  013746  006562                                                    MOV     RECRED,-
   (7) 005750  012746  006276                                                    MOV     #STAER6,
   (6) 005754  012746  000002                                                    MOV     #2,-(SP)
   (3) 005760  010600                                                            MOV     SP,R0
   (4) 005762  104414                                                            TRAP    C$PNTB
   (4) 005764  062706  000006                                                    ADD     #6,SP
 2549  005770                                  ENDIF
   (4) 005770                                                          50000$:
 2550  005770                                  PRINTX  #STAER2
   (7) 005770  012746  006332                                                    MOV     #STAER2,
   (6) 005774  012746  000001                                                    MOV     #1,-(SP)
   (3) 006000  010600                                                            MOV     SP,R0
   (4) 006002  104415                                                            TRAP    C$PNTX
   (4) 006004  062706  000004                                                    ADD     #4,SP
 2551  006010                                  PRINTX  #STAER3,CMDPKT,@TSDB(R5),MSGPKT+MS.RFC,TSSREG,CTCC
  (12) 006010  013746  003460                                                    MOV     CTCC,-(S
  (11) 006014  013746  003464                                                    MOV     TSSREG,-
  (10) 006020  013746  002344                                                    MOV     MSGPKT+M
   (9) 006024  017546  002456                                                    MOV     @TSDB(R5
   (8) 006030  013746  002314                                                    MOV     CMDPKT,-
   (7) 006034  012746  006411                                                    MOV     #STAER3,
   (6) 006040  012746  000006                                                    MOV     #6,-(SP)
   (3) 006044  010600                                                            MOV     SP,R0
   (4) 006046  104415                                                            TRAP    C$PNTX
   (4) 006050  062706  000016                                                    ADD     #16,SP
 2552  006054                                  PRINTX  #STAER4,CMDPKT+2,CMDPKT+4,CMDPKT+6
```

```
   (10) 006054  013746  002322                                                    MOV     CMDPKT+6
   (9)  006060  013746  002320                                                    MOV     CMDPKT+4
   (8)  006064  013746  002316                                                    MOV     CMDPKT+2
   (7)  006070  012746  006447                                                    MOV     #STAER4,
   (6)  006074  012746  000004                                                    MOV     #4,-(SP)
   (3)  006100  010600                                                            MOV     SP,R0
   (4)  006102  104415                                                            TRAP    C$PNTX
   (4)  006104  062706  000012                                                    ADD     #12,SP
 2553   006110                        PRINTX  #STAER5,MSGPKT+MS.XS0,MSGPKT+MS.XS1,MSGPKT+MS.XS2,MSGPKT+MS.XS3
  (11)  006110  013746  002354                                                    MOV     MSGPKT+M
  (10)  006114  013746  002352                                                    MOV     MSGPKT+M
  (9)   006120  013746  002350                                                    MOV     MSGPKT+M
  (8)   006124  013746  002346                                                    MOV     MSGPKT+M
  (7)   006130  012746  006467                                                    MOV     #STAER5,
  (6)   006134  012746  000005                                                    MOV     #5,-(SP)
  (3)   006140  010600                                                            MOV     SP,R0
  (4)   006142  104415                                                            TRAP    C$PNTX
  (4)   006144  062706  000014                                                    ADD     #14,SP
 2554   006150                        EXIT    MSG
  (4)   006150  000167                                                            .WORD   J$JMP
  (3)   006152  000410                                                            .WORD   L10003-2
 2555
 2556                                        .NLIST  BEX
 2557   006154  040445  054130  020130  STAER1: .ASCIZ  /%AXXX CMD FAILED - UNIT %D1%S3%APASS:%D5%S3%ARECORD:%D5%N/
 2558                                        .EVEN
 2559   006246  040445  051120  053105  STAER7: .ASCIZ  /%APREVIOUS CMD WAS  XXX/
 2560   006276  051445  030461  040445  STAER6: .ASCIZ  /%S11%A* RECORD READ:%D5%A */
 2561   006332  047045  040445  046503  STAER2: .ASCIZ  /%N%ACMDPKT%S2%ATSBA%S4%ARFC%S5%ATSSR%S3%ATCC%N/
 2562   006411     045  033117  051445  STAER3: .ASCIZ  /%06%S2%06%S2%06%S2%06%S2%D1%N/
 2563   006447     045  033117  047045  STAER4: .ASCII  /%06%N/
 2564   006454  047445  022466     116          .ASCII  /%06%N/
 2565   006461     045  033117  047045          .ASCIZ  /%06%N/
 2566   006467     045  054101  052123  STAER5: .ASCII  /%AXST0%S4%AXST1%S4%AXST2%S4%AXST3%N/
 2567   006532  047445  022466  031123          .ASCIZ  /%06%S2%06%S2%06%S2%06%N/
 2568                                        .LIST   BEX
 2569                                        .EVEN
 2570   006562  000000              RECRED: .WORD   0                       ;RECORD READ FROM TAPE
 2571
 2572   006564                              ENDMSG
   (3)  006564                      L10003:
   (3)  006564  104423                                                            TRAP    C$MSG
```

```
2574                                    .SBTTL  GLOBAL SUBROUTINES SECTION
2575                                    ;++
2576                                    ; THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
2577                                    ; THAT ARE USED IN MORE THAN ONE TEST.
2578                                    ;--
2579
2580                                    ;       MODULES TO HANDLE TU80 INTERRUPTS.
2581
2582  006566                            BGNSRV  TS4IN0                  ;DEVICE 0.
 (3)  006566                    TS4IN0::
2583  006566                            LET INTFLG := INTFLG + #1       ;SET INTERRUPT OCCURRED FLAG.
 (6)  006566  005237  003500                                                INC     INTFLG
2584  006572                            ENDSRV
 (3)  006572                    L10004:
 (2)  006572  000002                                                        RTI
2585
2586  006574                            BGNSRV  TS4IN1                  ;DEVICE 1.
 (3)  006574                    TS4IN1::
2587  006574                            LET INTFLG+2 := INTFLG+2 + #1   ;SET INTERRUPT OCCURRED FLAG.
 (6)  006574  005237  003502                                                INC     INTFLG+2
2588  006600                            ENDSRV
 (3)  006600                    L10005:
 (2)  006600  000002                                                        RTI
2589
2590  006602                            BGNSRV  TS4IN2                  ;DEVICE 2.
 (3)  006602                    TS4IN2::
2591  006602                            LET INTFLG+4 := INTFLG+4 + #1   ;SET INTERRUPT OCCURRED FLAG.
 (6)  006602  005237  003504                                                INC     INTFLG+4
2592  006606                            ENDSRV
 (3)  006606                    L10006:
 (2)  006606  000002                                                        RTI
2593
2594  006610                            BGNSRV  TS4IN3                  ;DEVICE 3.
 (3)  006610                    TS4IN3::
2595  006610                            LET INTFLG+6 := INTFLG+6 + #1   ;SET INTERRUPT OCCURRED FLAG.
 (6)  006610  005237  003506                                                INC     INTFLG+6
2596  006614                            ENDSRV
 (3)  006614                    L10007:
 (2)  006614  000002                                                        RTI
```

```
2598
2599                                    ;       SUBROUTINE TO RETRIEVE RECORD COUNT READ FROM TAPE FOR ERROR
2600                                    ;       PRINTS.
2601                                    ;       INPUTS:
2602                                    ;       OUTPUTS:  R3 = RECORD COUNT READ
2603                                    ;       REGISTERS:  R2, R3, R4
2604                                    ;       CALLS:
2605
2606  006616                            RECTAP::IF #MOD.CO SETIN CMDWRD THEN    ;READ REV FETCH
 (6)  006616  032737  000400  003430                                                      BIT     #MOD.CO,
 (9)  006624  001430                                                                     BEQ     50001$
2607  006626                              LET R2 := MSGPKT+MS.RFC + DATARD ;FIND LAST READ AD.
 (4)  006626  013702  002344                                                            MOV     MSGPKT+M
 (6)  006632  063702  003420                                                            ADD     DATARD,R
2608  006636                              IF #BIT00 SETIN R2 THEN       ;ODD AD., REASSEMBLE
 (6)  006636  032702  000001                                                            BIT     #BIT00,R
 (9)  006642  001417                                                                    BEQ     50002$
2609  006644                                LET R2 := R2 + #1           ;REC COUNT STARTING
 (6)  006644  005202                                                                    INC     R2
2610  006646                                LET R3 :B= (R2) CLR.BY #177400  ;WITH UPPER BYTE FETCH
 (4)  006646  111203                                                                    MOVB    (R2),R3
 (6)  006650  142703  177400                                                            BICB    #177400,
2611  006654                                LET R3 := SWAP R3           ;
 (6)  006654  000303                                                                    SWAB    R3
2612  006656                                LET R2 := R2 - #1           ;LOWER BYTE AD.
 (6)  006656  005302                                                                    DEC     R2
2613  006660                                IFB SWBFLG NE #0 THEN
 (6)  006660  105737  003526                                                            TSTB    SWBFLG
 (9)  006664  001401                                                                    BEQ     50003$
2614  006666                                  LET R2 := R2 - #1         ;LOWER BYTE AD. ON SWAP
 (6)  006666  005302                                                                    DEC     R2
2615  006670                                ENDIF
 (4)  006670                                                                  50003$:
2616  006670                                LET R4 :B= (R2) CLR.BY #177400 ;FETCH LOWER BYTE
 (4)  006670  111204                                                                    MOVB    (R2),R4
 (6)  006672  142704  177400                                                            BICB    #177400,
2617  006676                                LET R3 := R3 OR R4          ;MERGE BYTES
 (6)  006676  050403                                                                    BIS     R4,R3
2618  006700                              ELSE
 (4)  006700  000401                                                                    BR      50004$
 (3)  006702                                                                  50002$:
2619  006702                                LET R3 := (R2)              ;EVEN AD. FETCH
 (4)  006702  011203                                                                    MOV     (R2),R3
2620  006704                              ENDIF
 (4)  006704                                                                  50004$:
2621  006704                            ELSE
 (4)  006704  000402                                                                    BR      50005$
 (3)  006706                                                                  50001$:
2622  006706                              LET R3 := @DATARD           ;READ FWD FETCH
 (4)  006706  017703  174506                                                            MOV     @DATARD,
2623  006712                            ENDIF
 (4)  006712                                                                  50005$:
2624
2625  006712  000207                    RTS     PC
```

```
2628                                    ;       SUBROUTINE TO STORE A  SET CHARACTERISTIC COMMAND AS
2629                                    ;       THE FIRST ENTRY IN THE SEQUENCE TABLE.
2630                                    ;       INPUTS:
2631                                    ;       OUTPUTS:
2632                                    ;       REGISTERS:
2633                                    ;       CALLS:
2634
2635  006714                            SETCH:: LET R1 := #CMDSEQ               ;INIT COMMAND SEQUENCE TABLE POINTER.
 (4)  006714  012701  003544                                                                MOV     #CMDSEQ,
2636  006720  012721  140004                    MOV     #SCH,(R1)+              ;THIS CODE SETS UP A SET CHARACTERISTIC
2637  006724  012721  000040                    MOV     #DFTSCH,(R1)+           ;COMMAND AS THE FIRST COMMAND IN THE
2638  006730  012721  000001                    MOV     #1,(R1)+                ;SEQUENCE TABLE.
2639  006734  005721                            TST     (R1)+                   ;SKIP PATTERN LOCATION.
2640  006736  000207                            RTS PC
2641
2642
2643
2644
2645                                    ;       SUBROUTINE TO STORE A REWIND COMMAND IN THE SEQUENCE TABLE
2646                                    ;       INPUTS:
2647                                    ;       OUTPUTS:
2648                                    ;       REGISTERS:
2649                                    ;       CALLS:
2650
2651  006740                            SETRW:: LET (R1)+ := #RWD               ;CMD = REWIND.
 (4)  006740  012721  102010                                                                MOV     #RWD,(R1
2652  006744                                    LET (R1)+ := #1                 ;BRF.
 (4)  006744  012721  000001                                                                MOV     #1,(R1)+
2653  006750                                    LET (R1)+ := #1                 ;# OF OPERATIONS.
 (4)  006750  012721  000001                                                                MOV     #1,(R1)+
2654  006754  005721                            TST (R1)+                       ;SKIP PATTERN.
2655  006756  000207                            RTS     PC                      ;RETURN
```

```
                        ;       SUBROUTINE TO EXECUTE ALL COMMANDS IN THE SEQUENCE TABLE ON ALL
                        ;       DEVICES.
                        ;       INPUTS:
                        ;       OUTPUTS:        R2 = TERMINATION INDICATOR (0=END OF TABLE,1=EOT)
                        ;       REGISTERS:
                        ;       CALLS:          CMDAC,SETUP,EXSUB,CKHAE,NEXTU,FIRSTU,VFYDAT.

006760                  EXALL:: LET R1 := #CMDSEQ               ;INIT SEQUENCE TABL' OINTER.
(4) 006760  012701  003544                                                      MOV     #CMDSEQ,
006764                          WHILE (R1) NE #END DO           ;WHILE THERE ARE CMDS IN THE SEQUENCE TA
(4) 006764                                                                    50006$:
(6) 006764  021127  177777                                                      CMP     (R1),#EN
(9) 006770  001527                                                              BEQ     50007$
006772  004737  007722                    JSR   PC,SETUP          ;GO SETUP THE COMMAND BLOCK.
007776                                    WHILE NCNT LT NCNT1 DO  ;WHILE THERE ARE RECORDS REMAINING:
(4) 006776                                                                    50010$:
(6) 006776  023737  003422  003424                                               CMP     NCNT,NCN
(9) 007004  002116                                                              BGE     50011$
007006  004737  007614                      JSR PC,CMDAC          ;STORE CMD ASCII IN ERROR MESSAGE.
007012                                      IFB RANDOM NE #0 THEN ;IF IN RANDOM MODE:
(6) 007012  105737  003523                                                      TSTB    RANDOM
(9) 007016  001435                                                              BEQ     50012$
007020                                        IF CMDWRD EQ #WRT THEN ;IF CMD IS A WRITE THEN:
(6) 007020  023727  003430  104005                                               CMP     CMDWRD,#
(9) 007026  001031                                                              BNE     50013$
007030                                          IFB VFYFLG EQ #0 THEN ;IF DATA IS NOT TO BE VERIFIED THEN:
(6) 007030  105737  003524                                                      TSTB    VFYFLG
(9) 007034  001026                                                              BNE     50014$
007036                                            LET RANB := RANB + RANS  ;GENERATE
(6) 007036  063737  003444  003442                                              ADD     RANS,RAN
007044                                            LET RANS := RANS + RANB  ;RANDOM
(6) 007044  063737  003442  003444                                              ADD     RANB,RAN
007052                                            LET BRFCNT := RANS       ;LENGTH
(4) 007052  013737  003444  003426                                              MOV     RANS,BRF
007060                                            LET BRFCNT := BRFCNT CLR.BY LENMSK  ;MASK RANDOM LENGTH.
(6) 007060  043737  003440  003426                                              BIC     LENMSK,B
007066                                            IF BRFCNT LT #18. THEN        ;DO NOT ALLOW BYTE COUNT OF LESS
(6) 007066  023727  003426  000022                                               CMP     BRFCNT,#
(9) 007074  002003                                                              BGE     50015$
007076                                              LET BRFCNT := #18.  ;CHANGE COUNT OF 0-17 TO 18.
(4) 007076  012737  000022  003426                                              MOV     #18.,BRF
007104                                            ENDIF
(4) 007104                                                                    50015$:
007104                                            LET CMDPKT+CP.CNT := BRFCNT  ;MOVE BRF TO CMD PACKET.
(4) 007104  013737  003426  002322                                              MOV     BRFCNT,C
007112                                          ENDIF
(4) 007112                                                                    50014$:
007112                                        ENDIF
(4) 007112                                                                    50013$:
007112                                      ENDIF
(4) 007112                                                                    50012$:
007112  004737  007254                      JSR PC,EXSUB            ;ISSUE CMD TO ALL,AWAIT INTS,CHECK STATU
007116  004737  017222                      JSR PC,CKHAE            ;CHECK HALT AFTER EACH CMD FLAG.
007122                                      LET R2 := #1            ;SET ALL UNITS AT BOT/EOT.
(4) 007122  012702  000001                                                      MOV     #1,R2
007126  004737  016614                      JSR PC,FIRSTU           ;FIND FIRST UNIT.
```

```
                                        WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE UNITS:
                                                                                50016$:
2687  007132                                                                            CMP     DEVTBL(R
 (4)  007132                                                                            BEQ     50017$
 (6)  007132  026527  002536  177777
 (9)  007140  001426
                                          IF #MOD.CO SETIN CMDWRD THEN  ;IF CMD IS REVERSE THEN:
2688  007142                                                                           BIT     #MOD.CO,
 (6)  007142  032737  000400  003430                                                   BEQ     50020$
 (9)  007150  001406
                                            IF #XO.BOT NOTSETIN EOTFLG(R5) THEN  ;IF NOT AT BOT THEN:
2689  007152                                                                           BIT     #XO.BOT,
 (6)  007152  032765  000002  003510                                                   BNE     50021$
 (9)  007160  001001
                                              LET R2 := #0                      ;CLEAR EOT/BOT FLAG.
2690  007162                                                                           CLR     R2
 (4)  007162  005002
                                            ENDIF
2691  007164                                                                  50021$:
 (4)  007164
                                          ELSE                          ;ELSE IF CMD IS NOT REVERSE:
2692  007164                                                                           BR      50022$
 (4)  007164  000411
 (3)  007166                                                              50020$:
                                            IF #XO.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
2693  007166                                                                           BIT     #XO.EOT,
 (6)  007166  032765  000001  003510                                                   BEQ     50023$
 (8)  007174  001404                                                                   BIT     #CMD.CO,
 (6)  007176  032737  000001  003430                                                   BNE     50024$
 (9)  007204  001001
 (6)  007206                                                              50023$:
2694                                                                    ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
2695  007206                                      LET R2 := #0            ;CLEAR EOT/BOT FLAG.
 (4)  007206  005002                                                               CLR     R2
2696  007210                                    ENDIF
 (4)  007210                                                              50024$:
2697  007210                                  ENDIF
 (4)  007210                                                              50022$:
2698  007210  004737  016662                  JSR PC,NEXTU                 ;FIND NEXT UNIT
2699  007214                                 ENDDO                         ;
 (4)  007214  000746                                                               BR      50016$
 (3)  007216                                                              50017$:
2700  007216                                 IF R2 EQ #1 THEN             ;IF ALL UNIT ARE AT EOT/BOT THEN:
 (6)  007216  020227  000001                                                       CMP     R2,#1
 (9)  007222  001001                                                               BNE     50025$
2701  007224  000412                           BR        EXARTN          ;RETURN WITH R2 = #1.
2702  007226                                 ENDIF
 (4)  007226                                                              50025$:
2703  007226                                 LET NCNT := NCNT + #1        ;UPDATE RECORD COUNT.
 (6)  007226  005237  003422                                                       INC     NCNT
2704  007232                                 LET PCMDWD := CMDWRD         ;SAVE PREVIOUS COMMAND WORD.
 (4)  007232  013737  003430  003434                                               MOV     CMDWRD,P
2705  007240                               ENDDO
 (4)  007240  000656                                                               BR      50010$
 (3)  007242                                                              50011$:
2706  007242  004737  015370                JSR   PC,VFYDAT              ;IF LAST CMD WAS A WRITE VERIFY, THEN GO
2707                                                                    ;VERIFY THE LAST N RECORDS OF DATA.
2708  007246                             ENDDO
 (4)  007246  000646                                                               BR      50006$
 (3)  007250                                                              50007$:
2709  007250                             LET R2 := #0                     ;SET NORMAL RETURN INDICATOR.
 (4)  007250  005002                                                               CLR     R2
2710  007252  000207                  EXARTN: RTS PC                     ;RETURN.
2711
```

```
2712
2713
2714                                    ;       SUBROUTINE TO ISSUE COMMAND TO ALL DEVICES, WAIT FOR
2715                                    ;       ALL INTERRUPTS, AND CHECK ALL STATUS.
2716                                    ;       INPUTS:
2717                                    ;       OUTPUTS:
2718                                    ;       REGISTERS:
2719                                    ;       CALLS:          EXCUTE,GOWAIT,NEXTU,FIRSTU.
2720
2721  007254  004737  016614            EXSUB::     JSR PC,FIRSTU               ;SET UP FOR FIRST UNIT.
2722  007260                                        WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE DEVICES:
  (4) 007260                                                                                    50026$:
  (6) 007260  026527  002536  177777                                                            CMP     DEVTBL(R
  (9) 007266  001465                                                                            BEQ     50027$
2723  007270                                          IF #MOD.CO SETIN CMDWRD THEN  ;IF CMD IS REVERSE THEN:
  (6) 007270  032737  000400  003430                                                            BIT     #MOD.CO,
  (9) 007276  001421                                                                            BEQ     50030$
2724  007300                                            IF #X0.BOT NOTSETIN EOTFLG(R5) THEN  ;IF NOT AT BOT
  (6) 007300  032765  000002  003510                                                            BIT     #X0.BOT,
  (9) 007306  001014                                                                            BNE     50031$
2725  007310                                              IF #X0.EOT SETIN EOTFLG(R5) THEN  ;BUT IF AT EOT
  (6) 007310  032765  000001  003510                                                            BIT     #X0.EOT,
  (9) 007316  001406                                                                            BEQ     50032$
2726  007320                                                IFB ALLEOT NE #0 THEN       ;AND ALL OTHERS AT EOT
  (6) 007320  105737  003532                                                                    TSTB    ALLEOT
  (9) 007324  001402                                                                            BEQ     50033$
2727  007326  004737  010576                                  JSR PC,EXCUTE             ;THEN EXECUTE REV CMD
2728  007332                                                  ENDIF                     ;IF NOT ALL AT EOT, FREEZE UNIT(
  (4) 007332                                                                                    50033$:
2729  007332                                              ELSE                          ;IF NOT AT BOT AND
  (4) 007332  000402                                                                            BR      50034$
  (3) 007334                                                                                    50032$:
2730  007334  004737  010576                                JSR PC,EXCUTE             ;NOT AT EOT, EXEC REV CM
2731  007340                                                ENDIF
  (4) 007340                                                                                    50034$:
2732  007340                                            ENDIF
  (4) 007340                                                                                    50031$:
2733  007340                                          ELSE                        ;ELSE IF CMD IS NOT REVERSE:
  (4) 007340  000435                                                                            BR      50035$
  (3) 007342                                                                                    50030$:
2734  007342                                            IF CMDLG EQ #2 AND #X0.BOT SETIN EOTFLG(R5) THEN
  (6) 007342  023727  003436  000002                                                            CMP     CMDLG,#2
  (9) 007350  001011                                                                            BNE     50036$
  (6) 007352  032765  000002  003510                                                            BIT     #X0.BOT,
  (9) 007360  001405                                                                            BEQ     50036$
2735                                                                    ;CLEAR BAD SPOT COUNTS WHEN WRITING FROM
2736  007362                                              LET BTPT := BTADDR(R5)
  (4) 007362  016537  002550  003520                                                            MOV     BTADDR(R
2737  007370                                              LET @BTPT := #0
  (4) 007370  005077  174124                                                                    CLR     @BTPT
2738  007374                                            ENDIF
  (4) 007374                                                                                    50036$:
2739  007374                                            IF #X0.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
  (6) 007374  032765  000001  003510                                                            BIT     #X0.EOT,
  (8) 007402  001404                                                                            BEQ     50037$
  (6) 007404  032737  000001  003430                                                            BIT     #CMD.CO,
```

```
   (9)  007412  001003                                                                  BNE     50040$
   (6)  007414                                                                       50037$:
2740                                                                    ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
2741    007414  004737  010576                                              JSR PC,EXCUTE          ;ISSUE CMD TO TU80.
2742    007420                                                            ELSE
   (4)  007420  000405                                                                  BR      50041$
   (3)  007422                                                                       50040$:
2743    007422                                                              IFB ALLEOT NE #0 THEN
   (6)  007422  105737  003532                                                        TSTB    ALLEOT
   (9)  007426  001402                                                                BEQ     50042$
2744    007430  004737  010576                                                JSR PC,EXCUTE
2745    007434                                                            ENDIF
   (4)  007434                                                                       50042$:
2746    007434                                                            ENDIF
   (4)  007434                                                                       50041$:
2747    007434                                                          ENDIF
   (4)  007434                                                                       50035$:
2748    007434  004737  016662                                          JSR       PC,NEXTU      ;FIND NEXT UNIT IN TEST CYCLE.
2749    007440                                                          ENDDO
   (4)  007440  000707                                                                  BR      50026$
   (3)  007442                                                                       50027$:
2750    007442                                                        IFB RPTFLG NE #0 THEN     ;IF REPORT HAS BEEN REQUESTED THEN:
   (6)  007442  105737  003525                                                        TSTB    RPTFLG
   (9)  007446  001403                                                                BEQ     50043$
2751    007450                                                          LET RPTFLG :B= #0       ;CLR THE FLAG,
   (4)  007450  105037  003525                                                        CLRB    RPTFLG
2752    007454                                                          DORPT                   ;PRINT THE PERFORMANCE REPORT.
   (3)  007454  104424                                                                TRAP    C$DRPT
2753    007456                                                        ENDIF                     ;
   (4)  007456                                                                       50043$:
2754    007456  004737  016614                                      JSR PC,FIRSTU             ;SET UP FOR FIRST UNIT.
2755    007462                                                      WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE DEVICES:
   (4)  007462                                                                       50044$:
   (6)  007462  026527  002536  177777                                              CMP     DEVTBL(R
   (9)  007470  001450                                                                BEQ     50045$
2756    007472                                                        IF #MOD.CO SETIN CMDWRD THEN  ;IF CMD IS REVERSE THEN:
   (6)  007472  032737  000400  003430                                              BIT     #MOD.CO,
   (9)  007500  001421                                                                BEQ     50046$
2757    007502                                                          IF #XO.BOT NOTSETIN EOTFLG(R5) THEN  ;IF NOT AT BOT
   (6)  007502  032765  000002  003510                                              BIT     #XO.BOT,
   (9)  007510  001014                                                                BNE     50047$
2758    007512                                                            IF #XO.EOT SETIN EOTFLG(R5) THEN      ;BUT IF AT EOT
   (6)  007512  032765  000001  003510                                              BIT     #XO.EOT,
   (9)  007520  001406                                                                BEQ     50050$
2759    007522                                                              IFB ALLEOT NE #0 THEN               ;AND ALL OTHERS AT EOT
   (6)  007522  105737  003532                                                        TSTB    ALLEOT
   (9)  007526  001402                                                                BEQ     50051$
2760    007530  004737  011166                                                JSR PC,GOWAIT                     ;THEN WAIT FOR CMD END
2761    007534                                                              ENDIF                               ;IF NOT ALL AT EOT, DO N
   (4)  007534                                                                       50051$:
2762    007534                                                            ELSE                                  ;NOT AT BOT, AND NOT AT
   (4)  007534  000402                                                                BR      50052$
   (3)  007536                                                                       50050$:
2763    007536  004737  011166                                              JSR PC,GOWAIT                     ;WAIT FOR INT,CH
2764    007542                                                            ENDIF
   (4)  007542                                                                       50052$:
```

```
2765  007542                                                    ENDIF
 (4)  007542                                                                    50047$:
2766  007542                                                  ELSE                      ;ELSE IF CMD IS FORWARD:
 (4)  007542  000420                                                                      BR      50053$
 (3)  007544                                                                    50046$:
2767  007544                                                    IF #X0.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
 (6)  007544  032765  000001  003510                                                      BIT     #X0.EOT,
 (8)  007552  001404                                                                      BEQ     50054$
 (6)  007554  032737  000001  003430                                                      BIT     #CMD.CO,
 (9)  007562  001003                                                                      BNE     50055$
 (6)  007564                                                                    50054$:
2768                                                                                    ;IF NOT A1 EOT OR NOT A MOTION CMD THEN:
2769  007564  004737  01116(                                      JSR PC,GOWAIT       ;WAIT FOR INT,CHECK STATUS.
2770  007570                                                    ELSE
 (4)  007570  000405                                                                      BR      50056$
 (3)  007572                                                                    50055$:
2771  007572                                                      IFB ALLEOT NE #0 THEN
 (6)  007572  105737  003532                                                              TSTB    ALLEOT
 (9)  007576  001402                                                                      BEQ     50057$
2772  007600  004737  011166                                        JSR PC,GOWAIT
2773  007604                                                      ENDIF
 (4)  007604                                                                    50057$:
2774  007604                                                    ENDIF
 (4)  007604                                                                    50056$:
2775  007604                                                  ENDIF
 (4)  007604                                                                    50053$:
2776  007604  004737  016662                                  JSR       PC,NEXTU        ;FIND NEXT UNIT IN TEST CYCLE.
2777  007610                                                  ENDDO
 (4)  007610  000724                                                                      BR      50044$
 (3)  007612                                                                    50045$:
2778  007612  000207                                          RTS PC                    ;RETURN.
```

```
                                ;       THIS SUBROUTINE STORES THE ASCII FOR THE CURRENT COMMAND AND PREVIOUS
                                ;       COMMAND IN THE STANDARD ERROR MESSAGE.  ON ENTRY LOCATION CMDWRD
                                ;       CONTAINS CURRENT CMD AND LOCATION PCMDWD CONTAINS PREVIOUS CMD.
                                ;       INPUTS:
                                ;       OUTPUTS:
                                ;       REGISTERS:      R3, R4.
                                ;       CALLS:          GCMDA
                                
007614                          CMDAC:: LET R4 := CMDWRD                ;R4 = CMD BINARY.
(4) 007614  013704  003430                                                      MOV     CMDWRD,R
007620  004737  007670                  JSR     PC,GCMDA                ;GET CMD ASCII.
007624  112337  006156                  MOVB    (R3)+,STAER1+2          ;MOVE CMD ASCII
007630  112337  006157                  MOVB    (R3)+,STAER1+3          ;
007634  111337  006160                  MOVB    (R3),STAER1+4           ;INTO MSG.
007640                                  LET R4 := PCMDWD                ;R4 = PREVIOUS CMD BINARY.
(4) 007640  013704  003434                                                      MOV     PCMDWD,R
007644  004737  007670                  JSR     PC,GCMDA                ;GET CMD ASCII.
007650  000240                          NOP
007652                                  LET STAER7+24 :B= (R3)+         ;MOVE CMD ASCII
(4) 007652  112337  006272                                                      MOVB    (R3)+,ST
007656                                  LET STAER7+25 :B= (R3)+         ;
(4) 007656  112337  006273                                                      MOVB    (R3)+,ST
007662                                  LET STAER7+26 :B= (R3)          ;INTO MSG.
(4) 007662  111337  006274                                                      MOVB    (R3),STA
007666  000207                          RTS     PC                      ;RETURN. GO EXECUTE NEXT FUNCTION.
                                
                                
                                
                                ;       SUBROUTINE TO FIND THE ASCII EQUIVILENT OF THE COMMAND IN R4.
                                ;       ADDRESS OF ASCII 1ST WORD IS RETURNED IN R3.
                                ;       INPUTS:         R4 = PRESENT COMMAND WORD.
                                ;       OUTPUTS:        R3 = ADDRESS OF PRESENT COMMAND ASCII.
                                ;       REGISTERS:
                                ;       CALLS:
                                
007670                          GCMDA:: LET R3 := #0                    ;INIT CMD TBL POINTER.
(4) 007670  005003                                                              CLR     R3
007672                                  WHILE CMDTBL(R3) NE R4 DO       ;UNTIL CURRENT CMD IS FOUND:
(4) 007672                                                                  50060$:
(6) 007672  026304  003646                                                      CMP     CMDTBL(R
(9) 007676  001403                                                              BEQ     50061$
007700                                    LET R3 := R3 + #2             ;SEARCH CMD TABLE.
(6) 007700  062703  000002                                                      ADD     #2,R3
007704                                  ENDDO
(4) 007704  000772                                                              BR      50060$
(3) 007706                                                                  50061$:
007706                                  LET R4 := R3
(4) 007706  010304                                                              MOV     R3,R4
007710                                  LET R3 := R3 SHIFT -1           ;POINT TO ASCII FOR THAT COMMAND
(7) 007710  006203                                                              ASR     R3
007712  060403                          ADD     R4,R3
007714  062703  003734                  ADD     #CMDASC,R3
007720  000207                          RTS     PC                      ;RETURN.
```

```
 2820                                   ;       THIS SUBROUTINE LOADS THE TU80 COMMAND PACKET FROM ONE
 2821                                   ;       ENTRY IN THE SEQUENCE TABLE.
 2822                                   ;       INPUTS:
 2823                                   ;       OUTPUTS:
 2824                                   ;       REGISTERS:      R2, R3.
 2825                                   ;       CALLS:          GENPAT.
 2826
 2827  007722                           SETUP:: LET CMDLG := #0                 ;CLR CMD LOGGING CODE(DISABLES LOGGING)
  (4)  007722  005037  003436                                                            CLR     CMDLG
 2828  007726  012137  002314                   MOV     (R1)+,CMDPKT            ;LOAD THE COMMAND WORD.
 2829  007732  011137  002322                   MOV     (R1),CMDPKT+CP.CNT      ;LOAD THE BYTE/RECORD/FILE COUNT.
 2830  007736  011137  003426                   MOV     (R1),BRFCNT             ;SAVE BRF FOR THIS COMMAND.
 2831  007742  013702  002314                   MOV     CMDPKT,R2               ;GET CMD.
 2832  007746  042702  177740                   BIC     #NCMD.C,R2              ;CLR ALL BUT CMD BITS.
 2833  007752  010203                           MOV     R2,R3                   ;SAVE IT TWICE.
 2834  007754  162703  000010                   SUB     #CMD.C3,R3              ;POSITION COMMAND?
 2835  007760  001003                           BNE     2$                      ;BR IF NOT.
 2836  007762  011137  002316                   MOV     (R1),CMDPKT+2           ;MOVE BPCR IN 2ND PKT WORD FOR POSITION
 2837  007766  000461                           BR      3$
 2838  007770                           2$:     IF CMDPKT EQ #WTM THEN          ;IF CMD IS A WRITE TAPE MARK THEN:
  (6)  007770  023727  002314  100011                                                    CMP     CMDPKT,#
  (9)  007776  001003                                                                   BNE     50062$
 2839  010000                                   LET CMDLG := #2                 ;WTM LOGGING CODE IS 2.
  (4)  010000  012737  000002  003436                                                   MOV     #2,CMDLG
 2840  010006                                   ENDIF
  (4)  010006                                                                                   50062$:
 2841  010006  010203                           MOV     R2,R3
 2842  010010  162703  000001                   SUB     #CMD.C0,R3              ;IS IT A READ?
 2843  010014  001017                           BNE     1$                      ;BR IF NOT.
 2844  010016  013737  003420  002316           MOV     DATARD,CMDPKT+CP.ADL    ;IF SO, LOAD THE BUFFER ADDR.
 2845  010024                                   IF #MOD.C0 SETIN CMDPKT THEN    ;IF CMD IS A READ REV THEN:
  (6)  010024  032737  000400  002314                                                   BIT     #MOD.C0,
  (9)  010032  001404                                                                   BEQ     50063$
 2846  010034                                   LET CMDLG := #4                 ;LOGGING CODE IS 4.
  (4)  010034  012737  000004  003436                                                   MOV     #4,CMDLG
 2847  010042                                   ELSE                            ;ELSE - IF CMD IS A READ FWD:
  (4)  010042  000403                                                                   BR      50064$
  (3)  010044                                                                                   50063$:
 2848  010044                                   LET CMDLG := #6                 ;LOGGING CODE IS 6.
  (4)  010044  012737  000006  003436                                                   MOV     #6,CMDLG
 2849  010052                                   ENDIF
  (4)  010052                                                                                   50064$:
 2850  010052  000427                           BR      3$                      ;CONTINUE.
 2851  010054  010203                   1$:     MOV     R2,R3                   ;IS IT
 2852  010056  162703  000004                   SUB     #CMD.C2,R3              ;A SET CHARACTERISTICS CMD?
 2853  010062  001011                           BNE     4$                      ;BR IF NOT.
 2854  010064                                   LET CMDPKT+CP.ADL := #SCHBK     ;SET UP ADR LO FOR SET CHAR.
  (4)  010064  012737  002446  002316                                                   MOV     #SCHBK,C
 2855  010072  012737  000010  002322           MOV     #SCHCNT,CMDPKT+CP.CNT   ;SET BUFFER EXTENT
 2856  010100                                   LET SCHBK+6 := (R1)             ;STORE CHARACTERISTIC CODE IN SCH BLOCK.
  (4)  010100  011137  002454                                                           MOV     (R1),SCH
 2857  010104  000412                           BR      3$                      ;CONTINUE.
 2858  010106  010203                   4$:     MOV     R2,R3                   ;IS IT
 2859  010110  162703  000006                   SUB     #CMD.C1!CMD.C2,R3       ;A DIAGNOSTIC (DIA) CMD?
 2860  010114  001006                           BNE     3$                      ;BR IF NOT.
 2861  010116  012737  000020  002322           MOV     #DIACNT,CMDPKT+CP.CNT   ;LOAD BUFFER EXTENT.
```

```
2862  010124  012737  003416  002316          MOV     #DIABLK,CMDPKT+CP.ADL   ;LOAD BUFFER ADR LOW.
2863  010132  005721                  3$:     TST     (R1)+                   ;POINT TO N (NUMBER OF TIMES TO EXECUTE
2864  010134                                  LET NCNT1 := (R1)+              ;SAVE NUMBER OF OPERATIONS
 (4)  010134  012137  003424                                                                  MOV     (R1)+,NC
2865  010140                                  LET NCNT := #0                  ;CLEAR OPERATION COUNTER.
 (4)  010140  005037  003422                                                                  CLR     NCNT
2866  010144  012137  003456                  MOV     (R1)+,PATERN            ;SAVE PATTERN CODE FOR CURRENT CMD.
2867  010150  010203                          MOV     R2,R3                   ;IS IT
2868  010152  162703  000005                  SUB     #CMD.CO!CMD.C2,R3       ;A WRITE?
2869  010156  001010                          BNE     5$                      ;BR IF NOT.
2870  010160  013737  003416  002316          MOV     DATAWT,CMDPKT+CP.ADL    ;LOAD WRITE BUFFER LO ORDER.
2871  010166  004737  010300                  JSR     PC,GENPAT               ;GO GENERATE THE WRITE PATTERN.
2872  010172                                  LET CMDLG := #2                 ;WRITE LOGGING CODE IS 2.
 (4)  010172  012737  000002  003436                                                         MOV     #2,CMDLG
2873  010200                          5$:     IF #VFY.C SETIN CMDPKT THEN     ;IF DATA VERIFICATION IS REQUIRED:
 (6)  010200  032737  000100  002314                                                         BIT     #VFY.C,C
 (9)  010206  001407                                                                         BEQ     50065$
2874  010210                                    LET VFYFLG :B= #1             ;SET VERIFY FLAG.
 (4)  010210  112737  000001  003524                                                         MOVB    #1,VFYFL
2875  010216  042737  000100  002314            BIC   #VFY.C,CMDPKT           ;CLEAR VERIFY BIT(NOT USED BY HARDWARE).
2876  010224                                  ELSE                            ;IF DATA VERIFICATION IS NOT REQUIRED:
 (4)  010224  000402                                                                         BR      50066$
 (3)  010226                                                                        50065$:
2877  010226                                    LET VFYFLG :B= #0             ;CLR VERIFY FLAG.
 (4)  010226  105037  003524                                                                 CLRB    VFYFLG
2878  010232                                  ENDIF
 (4)  010232                                                                        50066$:
2879  010232                                  LET PCMDWD := CMDWRD            ;SAVE PREVIOUS CMD WORD.
 (4)  010232  013737  003430  003434                                                         MOV     CMDWRD,P
2880  010240                                  LET CMDWRD := CMDPKT            ;SAVE PRESENT CMD WORD.
 (4)  010240  013737  002314  003430                                                         MOV     CMDPKT,C
2881  010246                                  IFB SWBFLG NE #0 THEN           ;IF SWAP BYTES IS ENABLED:
 (6)  010246  105737  003526                                                                 TSTB    SWBFLG
 (9)  010252  001403                                                                         BEQ     50067$
2882  010254                                    LET CMDPKT := CMDPKT SET.BY #SWB.C  ;SET SWAP BIT IN COMMAND.
 (6)  010254  052737  010000  002314                                                         BIS     #SWB.C,C
2883  010262                                  ENDIF
 (4)  010262                                                                        50067$:
2884  010262  042737  004000  002314          BIC     #BRF.C,CMDPKT           ;CLR BRF BIT (INTERNAL ONLY).
2885  010270                                  LET CMDSAV := CMDPKT            ;SAVE 1ST WORD OF COMMAND PACKET.
 (4)  010270  013737  002314  003432                                                         MOV     CMDPKT,C
2886  010276  000207                          RTS     PC                      ;RETURN.
```

```
                        ;       THIS SUBROUTINE SETS UP AND CALLS THE APPROPRIATE SUBROUTINE TO GENERAT
                        ;       THE DESIRED PATTERN FOR THE WRITE AND WRITE/VERIFY COMMANDS.
                        ;       INPUTS:
                        ;       OUTPUTS:
                        ;       REGISTERS:      R2, R3, R4.
                        ;       CALLS:          PATR0 - PATR7

010300                  GENPAT:: LET R3 := PATERN SHIFT 1       ;SETUP PATTERN ROUTINE POINTER
(4) 010300  013703  003456                                              MOV     PATERN,R
(7) 010304  006303                                                      ASL     R3
010306                          LET R4 := BRFCNT + #1   ;SET LENGTH OF WRITE BFR
(4) 010306  013704  003426                                              MOV     BRFCNT,R
(6) 010312  005204                                                      INC     R4
010314                          LET R4 := R4 CLR.BY #1  ;ROUNDED UP TO NEXT WORD
(6) 010314  042704  000001                                              BIC     #1,R4
010320                          LET R4 := R4 - #2       ;WITH FIRST WORD RESERVED
(6) 010320  162704  000002                                              SUB     #2,R4
010324                          LET R2 := DATAWT + #2   ;FOR RECORD COUNT
(4) 010324  013702  003416                                              MOV     DATAWT,R
(6) 010330  062702  000002                                              ADD     #2,R2
010334  004773  010342                JSR     PC,@PATTBL(R3)  ;GO GENERATE THE APPROPRIATE PATTERN.
010340  000207                      RTS     PC              ;RETURN TO SETUP SUBROUTINE.

                        ;TU80 WRITE PATTERN LOOKUP TABLE.  USED TO JSR TO THE
                        ;CORRECT DATA PATTERN GENERATING ROUTINE.

010342  010364          PATTBL: PATR0                   ; INCREMENTING PATTERN, 0 - 377
010344  010422                  PATR1                   ; ALL ONES PATTERN
010346  010442                  PATR2                   ; ALL ZEROES PATTERN
010350  010452                  PATR3                   ; '1' BIT SHIFT, RIGHT TO LEFT
010352  010476                  PATR4                   ; '0' BIT SHIFT, RIGHT TO LEFT
010354  010510                  PATR5                   ; ALTERNATE '0' & '1' WITH ALT. BYTES COMPL.
010356  010522                  PATR6                   ; ALTERNATE BYTES OF 000 AND 377
010360  010542                  PATR7                   ; RANDOM PATTERN.
010362  010574                  PATR8                   ; DUMMY.  NO PATTERN, JUST EXITS.


                        ;INCREMENTING PATTERN.  0 - 377.

010364                  PATR0:: LET R3 := #400
(4) 010364  012703  000400                                              MOV     #400,R3
010370                  1$:     LET R4 := R4 - #2       ;DECREMENT WORD COUNT.
(6) 010370  162704  000002                                              SUB     #2,R4
010374  100411                  BMI     2$              ;BR IF DONE.
010376                          LET (R2)+ := R3         ;STORE DATA WORD.
(4) 010376  010322                                                      MOV     R3,(R2)+
010400                          LET R3 := R3 + #1002    ;UPDATE PATTERN.
(6) 010400  062703  001002                                              ADD     #1002,R3
010404                          IF R3 EQ #1000 THEN     ;IF PATTERN HAS WRAPPED AROUND THEN:
(6) 010404  020327  001000                                              CMP     R3,#1000
(9) 010410  001002                                                      BNE     50070$
010412                            LET R3 := #400          ;INIT THE PATTERN AGAIN.
(4) 010412  012703  000400                                              MOV     #400,R3
010416                          ENDIF
(4) 010416                                                      50070$:
010416  000764                  BR      1$              ;DO IT AGAIN.
```

```
 2928  010420  000207                    2$:     RTS     PC              ;RETURN.
 2929
 2930                                            ;ALL ONE'S PATTERN.
 2931
 2932  010422  012703  177777            PATR1:: MOV     #-1,R3          ;ALL ONES PATTERN;.
 2933  010426                            ZROPAT: LET R4 := R4 - #2       ;DECREMENT BYTE COUNT.
   (6) 010426  162704  000002                                                    SUB     #2,R4
 2934  010432  100402                            BMI     1$              ;DONE?,BR IF YES.
 2935  010434  010322                            MOV     R3,(R2)+        ;IF NOT LOAD NEXT BYTE WITH PATTERN.
 2936  010436  000773                            BR      ZROPAT          ;DO IT AGAIN.
 2937
 2938  010440  000207                    1$:     RTS     PC              ;RETURN.
```

```
                                        ;ALL ZEROES PATTERN.
                                        
010442  005003                  PATR2:: CLR     R3              ;CLR PATTERN REGISTER.
010444  004737  010426                  JSR     PC,ZROPAT       ;GO GENERATE IT.
010450  000207                          RTS     PC              ;RETURN.
                                        
                                        ;ONE BIT WALKING FROM R TO L IN A FIELD OF ZEROES.
                                        
010452  012703  000401          PATR3:: MOV     #401,R3         ;INIT PATTERN REGISTER.
010456                          WLKZRO: LET R4 := R4 - #2       ;DECREMENT WORD COUNT.
 (6)    010456  162704  000002                                                  SUB     #2,R4
010462  100404                          BMI     1$              ;BR IF DONE.
010464  010322                          MOV     R3,(R2)+        ;LOAD DATA.
010466  006303                          ASL     R3              ;SHIFT PATTERN.
010470  005503                          ADC     R3              ;ADD CARRY BACK INTO PATTERN.
010472  000771                          BR      WLKZRO          ;DO IT AGAIN.
010474  000207                  1$:     RTS     PC              ;RETURN.
                                        
                                        ;ZERO BIT WALKING FROM R TO L IN A FIELD OF 1'S.
                                        
010476  012703  177376          PATR4:: MOV     #177376,R3      ;INIT PATTERN REGISTER.
010502  004737  010456                  JSR     PC,WLKZRO       ;GO GENERATE ;IT.
010506  000207                          RTS     PC              ;RETURN.
                                        
                                        ;ALTERNATING ONE AND ZERO BITS WITH ALTERNATE BYTES
                                        ;COMPLEMENTED.
                                        
010510  012703  125125          PATR5:: MOV     #125125,R3      ;INIT PATTERN REGISTER.
010514  004737  010426                  JSR     PC,ZROPAT       ;GO GENERATE IT.
010520  000207                          RTS     PC              ;RETURN.
                                        
                                        ;ALTERNATING BYTES OF 000 AND 377.
                                        
010522  012703  177400          PATR6:: MOV     #177400,R3      ;INIT PATTERN REGISTER.
010526                          1$:     LET R4 := R4 - #2       ;DECREMENT WORD COUNT.
 (6)    010526  162704  000002                                                  SUB     #2,R4
010532  100402                          BMI     2$              ;BR IF DONE.
010534  010322                          MOV     R3,(R2)+        ;LOAD DATA.
010536  000773                          BR      1$              ;DO IT AGAIN.
010540  000207                  2$:     RTS     PC              ;RETURN.
                                        
                                        ;RANDOM PATTERN GENERATOR
                                        
010542                          PATR7:: LET R4 := R4 - #2       ;DECREMENT WORD COUNT
 (6)    010542  162704  000002                                                  SUB     #2,R4
010546  100411                          BMI     GIT             ;BR IF DONE.
010550  063737  003444  003442          ADD     RANS,RANB
010556  063737  003442  003444          ADD     RANB,RANS       ;GET NEW #.
010564  013722  003444                  MOV     RANS,(R2)+      ;SAVE #.
010570  000764                          BR      PATR7           ;CONTINUE.
010572  000207                  GIT:    RTS     PC              ;RETURN
                                        
                                        ;       NO PATTERN GENERATION.
                                        
010574  000207                  PATR8:: RTS     PC              ;RETURN.
```

```
2993                                    ;       THIS SUBROUTINE INITIATES TU80 COMMAND EXECUTION
2994                                    ;       AND CHECKS FOR TU80 RESPONSE.
2995                                    ;       INPUTS:
2996                                    ;       OUTPUTS:
2997                                    ;       REGISTERS:      R2, R3.
2998                                    ;       CALLS:          DROPU, MOVMSG, FIRSTU, NEXTU, WSSR.
2999
3000  010576                            EXCUTE::LET TIME1 := #-1                ;INIT TIMEOUT COUNTER.
 (4)  010576  012737  177777  003446                                                    MOV     #-1,TIME
3001  010604                                    REPEAT                          ;WAIT -
 (3)  010604                                                                                    50071$:
3002  010604                                      LET TIME1 := TIME1 - #1       ;UPDATE TIMEOUT COUNTER.
 (6)  010604  005337  003446                                                            DEC     TIME1
3003  010610                                      IF TIME1 EQ #0 THEN           ;IF TIMED OUT:
 (6)  010610  005737  003446                                                            TST     TIME1
 (9)  010614  001011                                                                    BNE     50072$
3004  010616  004737  011552                        JSR PC,MOVMSG               ;MOVE CURRENT PACKET MSG.
3005  010622                                        ERRDF 2,NSSRM,STAERM        ;REPORT TU80 NOT READY
 (4)  010622  104455                                                                    TRAP    C$ERDF
 (5)  010624  000002                                                                    .WORD   2
 (5)  010626  004355                                                                    .WORD   NSSRM
 (5)  010630  005642                                                                    .WORD   STAERM
3006  010632  004737  016716                        JSR PC,DROPU                ;DROP THE UNIT.
3007  010636  000552                                BR  EXCRTN                  ;RETURN.
3008  010640                                      ENDIF
 (4)  010640                                                                                    50072$:
3009  010640                                    UNTIL #TS.SSR SETIN @TSSR(R5)   ;WAIT UNTIL DEVICE IS READY.
 (3)  010640  032775  000200  002466                                                    BIT     #TS.SSR,
 (6)  010646  001756                                                                    BEQ     50071$
3010  010650                                    IF CMDWRD EQ #SCH THEN          ;IF WE ARE DOING A SET CHAR CMD THEN:
 (6)  010650  023727  003430  140004                                                    CMP     CMDWRD,#
 (9)  010656  001022                                                                    BNE     50073$
3011  010660                                      LET R5SAVE := R5                ;SAVE CURRENT DEVICE POINTER.
 (4)  010660  010537  003462                                                            MOV     R5,R5SAV
3012  010664  004737  016614                      JSR   PC,FIRSTU               ;FIND FIRST UNIT.
3013  010670                                      WHILE DEVTBL(R5) NE #END DO
 (4)  010670                                                                                    50074$:
 (6)  010670  026527  002536  177777                                                    CMP     DEVTBL(R
 (9)  010676  001405                                                                    BEQ     50075$
3014  010700  004737  011516                        JSR PC,WSSR                 ;WAIT FOR UNIT READY OR TIME OUT.
3015  010704  004737  016662                        JSR PC,NEXTU                ;FIND NEXT UNIT.
3016  010710                                      ENDDO
 (4)  010710  000767                                                                    BR      50074$
 (3)  010712                                                                                    50075$:
3017  010712                                      LET R5 := R5SAVE                ;RESTORE CURRENT DEVICE POINTER.
 (4)  010712  013705  003462                                                            MOV     R5SAVE,R
3018  010716                                      LET SCHBK := MSGPKA(R5)         ;SET UP ADR OF MSG PKT IN SCH BLOCK.
 (4)  010716  016537  002506  002446                                                    MOV     MSGPKA(R
3019  010724                                    ENDIF
 (4)  010724                                                                                    50073$:
3020  010724                                    LET R3 := MSGPKA(R5)            ;ADR OF THIS UNIT'S MSG PACKET.
 (4)  010724  016503  002506                                                            MOV     MSGPKA(R
3021  010730                                    LET R2 := #0                    ;CLR COUNTER.
 (4)  010730  005002                                                                    CLR     R2
3022  010732                                    WHILE R2 NE #MSGCNT DO          ;WHILE THERE ARE MORE LOCATIONS:
 (4)  010732                                                                                    50076$:
```

```
                                                                                                                    CMP     R2,#MSGC
                                                                                                                    BEQ     50077$
                                    LET (R3)+ := #-1                ;INIT THE MSG PACKET WITH ALL 1'S
                                                                                                                    MOV     #-1,(R3)
                                    LET R2 := R2 + #2               ;UPDATE COUNTER.
                                                                                                                    ADD     #2,R2
                                ENDDO
                                                                                                                    BR      50076$
                                                                                                          50077$:
                                TSTB    DINT                        ;ARE INTERRUPTS DISABLED.
                                BNE     1$                          ;BR IF YES.
                                IFB INTFLG(R5) GT #1 THEN           ;IF MORE THAN ONE INTERRUPT HAS OCCURED:
                                                                                                                    CMPB    INTFLG(R
                                                                                                                    BLE     50100$
                                    LET TSSREG := @TSSR(R5)                 ;FREEZE THE CURRENT STATUS REG F
                                                                                                                    MOV     @TSSR(R5
                                    ERRDF 15,TOOMM,STAERM   ;REPORT TOO MANY INTERRUPTS.
                                                                                                                    TRAP    C$ERDF
                                                                                                                    .WORD   15
                                                                                                                    .WORD   TOOMM
                                                                                                                    .WORD   STAERM
                                    JSR PC,DROPU                    ;DROP THE UNIT
                                    BR  EXCRTN                      ;RETURN - UNIT HAS BEEN DROPPED.
                                ENDIF
                                                                                                          50100$:
                                LET INTFLG(R5) := #0                ;CLR INTERRUPT FLAG FOR THIS DEV.
                                                                                                                    CLR     INTFLG(R
                                BIS     #IE.C,CMDPKT                ;SET INT ENABLE BIT.
                        1$:     IFB ERRREC EQ #0 THEN               ;IF NOT RETRYING
                                                                                                                    TSTB    ERRREC
                                                                                                                    BNE     50101$
                                    LET RECCNT(R5) := RECCNT(R5) + #1
                                                                                                                    INC     RECCNT(R
                                    LET @DATAWT := RECCNT(R5)       ;THEN UPDATE REC COUNT TO WRITE IT ON TA
                                                                                                                    MOV     RECCNT(R
                                ENDIF
                                                                                                          50101$:
                                IF L$TEST EQ #3 AND CMDWRD EQ #WRT THEN
                                                                                                                    CMP     L$TEST,#
                                                                                                                    BNE     50102$
                                                                                                                    CMP     CMDWRD,#
                                                                                                                    BNE     50102$
                                 IF NCNT GT #3500. THEN
                                                                                                                    CMP     NCNT,#35
                                                                                                                    BLE     50103$
                                  DELAY 15.
                                                                                                                    MOV     #15.,(PC
                                                                                                                    .WORD   0
                                                                                                                    MOV     L$DLY,(P
                                                                                                                    .WORD   0
                                                                                                                    DEC     -6(PC)
                                                                                                                    BNE     .-4
                                                                                                                    DEC     -22(PC)
                                                                                                                    BNE     .-20
                                 ENDIF
                                                                                                          50103$:
```

```
3044  011126                                          ENDIF
 (4)  011126                                                                  50102$:
3045  011126  012775  002314  002456                 MOV     #CMDPKT,@TSDB(R5)    ;LOAD TSDB WITH CMDPKT ADDRESS
3046                                                                            ;THIS INITIATES COMMAND EXECUTION.
3047  011134                                          IF #TS.SSR SETIN @TSSR(R5) THEN ;IF READY DID NOT DROP THEN:
 (6)  011134  032775  000200  002466                                                  BIT     #TS.SSR,
 (9)  011142  001410                                                                  BEQ     50104$
3048  011144  004737  011552                           JSR   PC,MOVMSG              ;MOVE CURRENT MESSAGE PACKET TO COMMON
3049  011150                                          ERRDF 3,TOERM,STAERM           ;REPORT NO TU80 RESPONSE.
 (4)  011150  104455                                                                  TRAP    C$ERDF
 (5)  011152  000003                                                                  .WORD   3
 (5)  011154  004273                                                                  .WORD   TOERM
 (5)  011156  005642                                                                  .WORD   STAERM
3050  011160  004737  016716                          JSR PC,DROPU                  ;DROP THE UNIT
3051  011164                                          ENDIF
 (4)  011164                                                                  50104$:
3052  011164  000207                        EXCRTN:  RTS     PC                    ;RETURN.
```

```
3054                                    ;       THIS SUBROUTINE WAITS FOR THE TU80 INERRUPT OR DONE BIT TO SET AND ALLOW
3055                                    ;       OPERATOR TO TRANSFER CONROL TO THE SUPERVISOR.
3056                                    ;       UPON APPEARANCE OF THE INTERRUPT OR DONE, CHECK TSSR FOR STATUS ERRORS,
3057                                    ;       LOG BYTES AND ERRORS AND PERFORM ERROR RECOVERY IF NESSASARY.
3058                                    ;       INPUTS:
3059                                    ;       OUTPUTS:
3060                                    ;       REGISTERS:      R2, R3.
3061                                    ;       CALLS:          DROPU, MOVMSG, RECUD, CHKERR, LOG, CLRERR.
3062
3063  011166                            GOWAIT::IF DEVTBL(R5) EQ #NINUSE THEN
 (6)  011166  026527  002576  177774                                                    CMP     DEVTBL(R
 (9)  011174  001002                                                                    BNE     50105$
3064  011176  000540                            BR      1$
3065  011200                            ELSE
 (4)  011200  000400                                                                    BR      50106$
 (3)  011202                                                                    50105$:
3066  011202                            ENDIF
 (4)  011202                                                                    50106$:
3067  011202                            LET TIME1 := #-1                ;INIT TIME OUT COUNTER.
 (4)  011202  012737  177777  003446                                                    MOV     #-1,TIME
3068  011210                            REPEAT                          ;REPEAT UNTIL INTERRUPT OCCURES:
 (3)  011210                                                                    50107$:
3069  011210                              BREAK                         ;GO TO THE SUPER TO ALLOW TTY INPUT.
 (3)  011210  104422                                                                    TRAP    C$BRK
3070  011212                              IF CMDWRD EQ #RWD THEN        ;IF COMMAND WAS REWIND THEN:
 (6)  011212  023727  003430  102010                                                    CMP     CMDWRD,#
 (9)  011220  001014                                                                    BNE     50110$
3071  011222                                DELAY 10.                   ;WAIT  EXTRA 10 MSECS EACH LOOP.
 (2)  011222  012727  000012                                                            MOV     #10.,(PC
 (2)  011226  000000                                                                    .WORD   0
 (2)  011230  013727  002116                                                            MOV     L$DLY,(P
 (2)  011234  000000                                                                    .WORD   0
 (2)  011236  005367  177772                                                            DEC     -6(PC)
 (2)  011242  001375                                                                    BNE     .-4
 (2)  011244  005367  177756                                                            DEC     -22(PC)
 (2)  011250  001367                                                                    BNE     .-20
3072  011252                              ENDIF
 (4)  011252                                                                    50110$:
3073  011252                              IF CMDWRD EQ #SFF OR CMDWRD EQ #SFR THEN
 (6)  011252  023727  003430  105010                                                    CMP     CMDWRD,#
 (8)  011260  001404                                                                    BEQ     50111$
 (6)  011262  023727  003430  105410                                                    CMP     CMDWRD,#
 (9)  011270  001014                                                                    BNE     50112$
 (6)  011272                                                                    50111$:
3074  011272                                DELAY 12.                   ;ADD DELAY FOR SPACE TAPE MARK COMMANDS
 (2)  011272  012727  000014                                                            MOV     #12.,(PC
 (2)  011276  000000                                                                    .WORD   0
 (2)  011300  013727  002116                                                            MOV     L$DLY,(P
 (2)  011304  000000                                                                    .WORD   0
 (2)  011306  005367  177772                                                            DEC     -6(PC)
 (2)  011312  001375                                                                    BNE     .-4
 (2)  011314  005367  177756                                                            DEC     -22(PC)
 (2)  011320  001367                                                                    BNE     .-20
3075  011322                              ENDIF
 (4)  011322                                                                    50112$:
3076  011322                              IFB DINT EQ #0 THEN           ;IF INTERRUPTS ARE ENABLED.
```

```
  (6)  011322  105737  002212                                                    TSTB    DINT
  (9)  011326  001003                                                            BNE     50113$
3077   011330                       LET R2 := INTFLG(R5)        ;FETCH INTERRUPT OCCURRED FLAG.
  (4)  011330  016502  003500                                                    MOV     INTFLG(R
3078   011334                     ELSE                        ;IF IN BRUTUS MODE:
  (4)  011334  000406                                                            BR      50114$
  (3)  011336                                                          50113$:
3079   011336                       LET R3 := COMP #TS.SSR      ;SET UP A MASK FOR THE DONE BIT.
  (6)  011336  012703  000200                                                    MOV     #TS.SSR,
  (6)  011342  005103                                                            COM     R3
3080   011344                       LET R2 := @TSSR(R5) CLR.BY R3  ;FETCH DONE BIT.
  (4)  011344  017502  002466                                                    MOV     @TSSR(R5
  (6)  011350  040302                                                            BIC     R3,R2
3081   011352                     ENDIF
  (4)  011352                                                          50114$:
3082   011352                     LET TIME1 := TIME1 - #1       ;UPDATE TIMEOUT COUNTER.
  (6)  011352  005337  003446                                                    DEC     TIME1
3083   011356                   UNTIL R2 NE #0 OR TIME1 EQ #0   ;REPEAT UNTIL INTERRUPT OR READY OCCURES
  (4)  011356  005702                                                            TST     R2
  (6)  011360  001003                                                            BNE     50115$
  (4)  011362  005737  003446                                                    TST     TIME1
  (7)  011366  001310                                                            BNE     50107$
  (4)  011370                                                          50115$:
3084   011370                     IF TIME1 EQ #0 THEN           ;IF TIME OUT HAS OCCURRED:
  (6)  011370  005737  003446                                                    TST     TIME1
  (9)  011374  001022                                                            BNE     50116$
3085   011376                       LET @DATAWT := RECCNT(R5) - #1 ;RE-ADJUST REC COUNT DOWN
  (4)  011376  016577  003330  172012                                            MOV     RECCNT(R
  (6)  011404  005377  172006                                                    DEC     @DATAWT
3086   011410  004737  011552       JSR   PC,MOVMSG             ;MOVE CURRENT MSG PACKET TO COMMON AREA.
3087   011414                       ERRDF 4,NOINTM,STAERM ;REPORT NO INTERRUPT.
  (4)  011414  104455                                                            TRAP    C$ERDF
  (5)  011416  000004                                                            .WORD   4
  (5)  011420  004505                                                            .WORD   NOINTM
  (5)  011422  005642                                                            .WORD   STAERM
3088   011424  004737  016716       JSR PC,DROPU          ;DROP THE UNIT.
3089   011430                       LET R3 := #ENDERF
  (4)  011430  012703  003500                                                    MOV     #ENDERF,
3090   011434  004737  011502       JSR PC,CLRERR               ;CLEAR ALL ERROR FLAGS
3091   011440                     ELSE
  (4)  011440  000417                                                            BR      50117$
  (3)  011442                                                          50116$:
3092   011442  004737  011552       JSR   PC,MOVMSG             ;MOVE CURRENT MSG. PACKET TO COMMON AREA
3093   011446  004737  011636       JSR   PC,RECUD              ;UPDATE THE RECORD COUNT.
3094   011452  004737  012004       JSR   PC,CHKERR             ;CHECK FOR STATUS ERRORS.
3095   011456                       IFB WRTYFG EQ #0 THEN       ;
  (6)  011456  105737  003471                                                    TSTB    WRTYFG
  (9)  011462  001006                                                            BNE     50120$
3096   011464  004737  014664         JSR PC,LOG                ;LOG BYTES AND ERRORS.
3097   011470                         LET R3 := #ENDERF
  (4)  011470  012703  003500                                                    MOV     #ENDERF,
3098   011474  004737  011502         JSR PC,CLRERR                     ;CLEAR ALL ERROR FLAGS
3099   011500                       ENDIF
  (4)  011500                                                          50120$:
3100   011500                     ENDIF
  (4)  011500                                                          50117$:
```

```
  3101  011500  000207                    1$:     RTS     PC                  ;RETURN IF DONE.
```

```
                                        ;       SUBROUTINE TO CLEAR FLAGS.
                                        ;       INPUTS:         R3 = LWA TO BE CLEARED + 2.
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R2
                                        ;       CALLS:

011502                                  CLRERR:: LET R2 := #BGNFLG
011502  012702  003466                                                          MOV     #BGNFLG,
                                                REPEAT
011506                                                                  50121$:
                                                  LET (R2)+ := #0
011506  005022                                                                 CLR     (R2)+
                                                UNTIL R2 EQ R3
011510  020203                                                                 CMP     R2,R3
011512  001375                                                                 BNE     50121$
011514  000207                                  RTS PC


                                        ;       SUBROUTINE TO WAIT UNTIL CURRENT UNIT IS READY OR UNTIL TIME OUT.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:
                                        ;       CALLS:

011516                                  WSSR::  LET TIME1 := #-1                ;INIT TIMEOUT COUNTER.
011516  012737  177777  003446                                                  MOV     #-1,TIME
                                                REPEAT                          ;REPEAT UNTIL DEV READY OR TIMEOUT:
011524                                                                  50122$:
                                                  BREAK                           ;BREAK TO THE SUPERVISOR.
011524  104422                                                                 TRAP    C$BRK
                                                  LET TIME1 := TIME1 - #1         ;UPDATE TIMEOUT COUNTER.
011526  005337  003446                                                         DEC     TIME1
                                                UNTIL #TS.SSR SETIN @TSSR(R5) OR TIME1 EQ #0
011532  032775  000200  002466                                                 BIT     #TS.SSR,
011540  001003                                                                 BNE     50125$
011542  005737  003446                                                         TST     TIME1
011546  001366                                                                 BNE     50122$
011550                                                                  50123$:
                                                                        ;REPEAT UNTIL DEV READY OR TIMEOUT.
011550  000207                                  RTS PC                  ;RETURN.
```

```
3133
3134                                    ;       SUBROUTINE TO MOVE THE CURRENT MESSAGE PACKET TO THE COMMON AREA AND
3135                                    ;       TO UPDATE THE CURRENT TERMINATION CLASS CODE.
3136                                    ;       INPUTS:
3137                                    ;       OUTPUTS:
3138                                    ;       REGISTERS:      R2, R3.
3139                                    ;       CALLS:
3140
3141  011552                            MOVMSG:: LET TSSREG := @TSSR(R5)        ;FREEZE THE STATUS REG CONTENTS
 (4)  011552  017537  002466  003464                                                    MOV     @TSSR(R5
3142  011560          LET R2 := TSSREG CLR.BY #TSC.TCC ;EXTRACT THE TERMINATION CLASS CODE,
 (4)  011560  013702  003464                                                            MOV     TSSREG,R
 (6)  011564  042702  177761                                                            BIC     #TSC.TCC
3143  011570          LET CTCC := R2 SHIFT -1         ;AND SAVE IT
 (4)  011570  010237  003460                                                            MOV     R2,CTCC
 (7)  011574  006237  003460                                                            ASR     CTCC
3144  011600          LET R3 := MSGPKA(R5)            ;ADR OF THIS DEVICE'S MSG.
 (4)  011600  016503  002506                                                            MOV     MSGPKA(R
3145  011604          LET R2 := #0                    ;CLR COUNTER.
 (4)  011604  005002                                                                    CLR     R2
3146  011606          WHILE R2 NE #MSGCNT DO          ;WHILE THERE ARE MORE LOCATIONS:
 (4)  011606                                                                    50124$:
 (6)  011606  020227  000016                                                            CMP     R2,#MSGC
 (9)  011612  001405                                                                    BEQ     50125$
3147  011614            LET MSGPKT(R2) := (R3)+       ;MOVE MSG TO COMMON AREA.
 (4)  011614  012362  002340                                                            MOV     (R3)+,MS
3148  011620            LET R2 := R2 + #2             ;UPDATE COUNTER.
 (6)  011620  062702  000002                                                            ADD     #2,R2
3149  011624          ENDDO
 (4)  011624  000770                                                                    BR      50124$
 (3)  011626                                                                    50125$:
3150  011626          LET EOTFLG(R5) := MSGPKT+MS.XS0 ;MOVE XSTAT0 TO EOT FLAG.
 (4)  011626  013765  002346  003510                                                    MOV     MSGPKT+M
3151  011634  000207          RTS     PC
```

```
3153                                    ;       SUBROUTINE TO ADJUST THE RECORD COUNT.
3154                                    ;       INPUTS:
3155                                    ;       OUTPUTS:
3156                                    ;       REGISTERS:
3157                                    ;       CALLS:
3158
3159  011636                            RECUD:: IFB RECLOG EQ #0 THEN           ;IF RECORD HAS NOT BEEN LOGGED:
 (6)  011636  105737  003473                                                      TSTB    RECLOG
 (9)  011642  001057                                                              BNE     50126$
3160  011644                              LET RECCNT(R5) := RECCNT(R5) - #1
 (6)  011644  005365  003330                                                      DEC     RECCNT(R
3161  011650                              IF #BIT0 NOTSETIN CTCC AND #X2.OPM SETIN MSGPKT+MS.XS2 THEN   ;IF TAPE
 (6)  011650  032737  000001  003460                                             BIT     #BIT0,CT
 (9)  011656  001046                                                             BNE     50127$
 (6)  011660  032737  100000  002352                                             BIT     #X2.OPM,
 (9)  011666  001442                                                             BEQ     50127$
3162  011670                                LET RECLOG :B= RECLOG + #1  ;SET RECORD LOGGED,
 (6)  011670  105237  003473                                                      INCB    RECLOG
3163  011674                              IF CMDWRD EQ #RWD THEN      ;IF THIS IS A REWIND CMD:
 (6)  011674  023727  003430  102010                                             CMP     CMDWRD,#
 (9)  011702  001003                                                             BNE     50130$
3164  011704                                LET RECCNT(R5) := #0      ;CLEAR RECORD COUNT,
 (4)  011704  005065  003330                                                     CLR     RECCNT(R
3165  011710                              ELSE
 (4)  011710  000431                                                             BR      50131$
 (3)  011712                                                          50130$:
3166  011712                                IF #BRF.C SETIN CMDWRD THEN       ;IF BRF USED, UPDATE RECORD COUN
 (6)  011712  032737  004000  003430                                             BIT     #BRF.C,C
 (9)  011720  001425                                                             BEQ     50132$
3167  011722                                  IF #MOD.CO NOTSETIN CMDWRD THEN  ;IF A FORWARD CMD:
 (6)  011722  032737  000400  003430                                             BIT     #MOD.CO,
 (9)  011730  001007                                                             BNE     50133$
3168  011732                                    IF #MOD.CO NOTSETIN PCMDWD THEN  ;IF PREV CMD WAS A FWD ALSO:
 (6)  011732  032737  000400  003434                                             BIT     #MOD.CO,
 (9)  011740  001002                                                             BNE     50134$
3169  011742                                      LET RECCNT(R5) := RECCNT(R5) + #1  ;INCREMENT RECORD COUNT.
 (6)  011742  005265  003330                                                     INC     RECCNT(R
3170  011746                                    ENDIF
 (4)  011746                                                          50134$:
3171  011746                                  ELSE                        ;IF REVERSE CMD:
 (4)  011746  000412                                                             BR      50135$
 (3)  011750                                                          50133$:
3172  011750                                    IF #MOD.CO SETIN PCMDWD THEN  ;IF PREVIOUS CMD WAS A REV ALSO:
 (6)  011750  032737  000400  003434                                             BIT     #MOD.CO,
 (9)  011756  001406                                                             BEQ     50136$
3173  011760                                      IF #X0.BOT NOTSETIN EOTFLG(R5) THEN ;WHEN NOT AT BOT THEN
 (6)  011760  032765  000002  003510                                             BIT     #X0.BOT,
 (9)  011766  001002                                                             BNE     50137$
3174  011770                                        LET RECCNT(R5) := RECCNT(R5) - #1  ;DECREMENT RECORD COUNT
 (6)  011770  005365  003330                                                     DEC     RECCNT(R
3175  011774                                      ENDIF
 (4)  011774                                                          50137$:
3176  011774                                    ENDIF
 (4)  011774                                                          50136$:
3177  011774                                  ENDIF
 (4)  011774                                                          50135$:
```

```
3178  011774                                        ENDIF
 (4)  011774                                                                  501328$:
3179  011774                                       ENDIF
 (4)  011774                                                                  501318$:
3180  011774                                     ENDIF
 (4)  011774                                                                  501278$:
3181  011774                                     LET @DATAWT := RECCNT(R5)
 (4)  011774  016577  003330  171414                                                MOV     RECCNT(R
3182  012002                                   ENDIF
 (4)  012002                                                                  501268$:
3183  012002  000207                           RTS     PC                  ;RETURN.
```

```
3185                                    ;       THIS IS THE ERROR CHECK SUBROUTINE.  AFTER INTERRUPT THIS
3186                                    ;       SUBROUTINE IS CALLED TO CHECK THE TU80 STATUS.
3187                                    ;       IF SPECIAL COND IS SET THEN THE TCC HANDLING SUBROUTINE IS ENTERED.
3188                                    ;       IF THE RFC IS NON ZERO FOR A COMMAND REQUIRING A BPCR,
3189                                    ;       THEN AN ERROR RFC IS REPORTED.
3190                                    ;       INPUTS:
3191                                    ;       OUTPUTS:
3192                                    ;       REGISTERS:      R2, R4.
3193                                    ;       CALLS:          TCC0-TCC7.
3194
3195  012004                            CHKERR::IF DEVTBL(R5) EQ #NINUSE THEN
 (6)  012004  026527  002536  177774                                                  CMP     DEVTBL(R
 (9)  012012  001003                                                                  BNE     50140$
3196  012014  000137  012230                    JMP     1$
3197  012020                            ELSE
 (4)  012020  000400                                                                  BR      50141$
 (3)  012022                                                                50140$:
3198  012022                            ENDIF
 (4)  012022                                                                50141$:
3199  012022                            IF #TS.SC SETIN TSSREG THEN     ;IF SPECIAL COND STATUS IS SET THEN:
 (6)  012022  032737  100000  003464                                                  BIT     #TS.SC,T
 (9)  012030  001441                                                                  BEQ     50142$
3200  012032                              IF CTCC NE #2 THEN            ;IF TCC IS NOT 2 THEN:
 (6)  012032  023727  003460  000002                                                  CMP     CTCC,#2
 (9)  012040  001405                                                                  BEQ     50143$
3201  012042                                IFB ERRREC EQ #0 THEN       ;IF NOT IN ERROR RECOVERY:
 (6)  012042  105737  003477                                                          TSTB    ERRREC
 (9)  012046  001002                                                                  BNE     50144$
3202  012050  005265  003270                    INC     SCCNT(R5)       ;INC SC COUNTER.
3203  012054                                  ENDIF
 (4)  012054                                                                50144$:
3204  012054                              ENDIF
 (4)  012054                                                                50143$:
3205  012054                              IF #TS.NXM SETIN TSSREG OR #TS.UPE SETIN TSSREG THEN  ;WHEN NON-EXISTA
 (6)  012054  032737  004000  003464                                                  BIT     #TS.NXM,
 (8)  012062  001004                                                                  BNE     50145$
 (6)  012064  032737  040000  003464                                                  BIT     #TS.UPE,
 (9)  012072  001412                                                                  BEQ     50146$
 (6)  012074                                                                50145$:
3206  012074                                IF #X2.OPM NOTSETIN MSGPKT+MS.XS2 THEN                ;AND TAPE NOT MO
 (6)  012074  032737  100000  002352                                                  BIT     #X2.OPM,
 (9)  012102  001003                                                                  BNE     50147$
3207  012104                                  LET R2 := #5              ;SET TCC5 INDEX
 (4)  012104  012702  000005                                                          MOV     #5,R2
3208  012110                                ELSE
 (4)  012110  000402                                                                  BR      50150$
 (3)  012112                                                                50147$:
3209  012112                                  LET R2 := #4              ;TAPE MOVED, SET TCC4 INDEX
 (4)  012112  012702  000004                                                          MOV     #4,R2
3210  012116                                ENDIF
 (4)  012116                                                                50150$:
3211  012116                              ELSE
 (4)  012116  000402                                                                  BR      50151$
 (3)  012120                                                                50146$:
3212  012120                                LET R2 := CTCC                ;SET DETECTED TCC INDEX
 (4)  012120  013702  003460                                                          MOV     CTCC,R2
```

```
3213  012124                                                ENDIF
 (4)  012124                                                                                50151$:
3214  012124                                                LET R2 := R2 SHIFT 1  ;CURRENT TCC X 2.
 (7)  012124  006302                                                                        ASL     R2
3215  012126  004772  012232                               JSR   PC,@TCCRA(R2)           ;GO TO THE TCC HANDLING SUBROUTINE.
3216  012132                                              ELSE
 (4)  012132  000430                                                                        BR      50152$
 (3)  012134                                                                                50142$:
3217  012134                                                IF #BRF.C SETIN CMDWRD THEN   ;IF BRF IS USED IN THIS CMD THEN:
 (6)  012134  032737  004000  003430                                                       BIT     #BRF.C,C
 (9)  012142  001424                                                                        BEQ     50153$
3218  012144                                                  IF MSGPKT+MS.RFC NE #0 THEN   ;IF THERE IS AN RFC THEN:
 (6)  012144  005737  002344                                                               TST     MSGPKT+M
 (9)  012150  001421                                                                        BEQ     50154$
3219  012152                                                    IFB RANDOM EQ #0 ORB VFYFLG NE #0 THEN
 (6)  012152  105737  003523                                                               TSTB    RANDOM
 (8)  012156  001403                                                                        BEQ     50155$
 (6)  012160  105737  003524                                                               TSTB    VFYFLG
 (9)  012164  001413                                                                        BEQ     50156$
 (6)  012166                                                                                50155$:
3220                                                                                                ;IF NOT IN RANDOM OR IF CMD IS W
3221  012166                                                      IFB IRE EQ #0 THEN              ;IF RFC ERROR REPORTS ARE ALLOWE
 (6)  012166  105737  003527                                                               TSTB    IRE
 (9)  012172  001010                                                                        BNE     50157$
3222  012174                                                      LET HRDCNT(R5) := HRDCNT(R5) + #1  ;UPDATE HARD ERROR COUNT
 (6)  012174  005265  003310                                                               INC     HRDCNT(R
3223  012200                                                      ERRHRD 13,RFCERM,STAERM ;REPORT RFC ERROR
 (4)  012200  104456                                                                       TRAP    C$ERHRD
 (5)  012202  000015                                                                       .WORD   13
 (5)  012204  004340                                                                       .WORD   RFCERM
 (5)  012206  005642                                                                       .WORD   STAERM
3224  012210  004737  013360                                 JSR     PC,RAMDUM             ;GO DO RAM DUMP
3225  012214                                                  ENDIF
 (4)  012214                                                                                50157$:
3226  012214                                                ENDIF
 (4)  012214                                                                                50156$:
3227  012214                                              ENDIF
 (4)  012214                                                                                50154$:
3228  012214                                            ENDIF
 (4)  012214                                                                                50153$:
3229  012214                                          ENDIF
 (4)  012214                                                                                50152$:
3230  012214                                          IFB RWERR NE #0 THEN          ;IF A READ/WRITE ERROR HAS OCCURRED THEN
 (6)  012214  105737  003475                                                               TSTB    RWERR
 (9)  012220  001403                                                                        BEQ     50160$
3231  012222                                            LET CMDPKT := CMDSAV          ;RESTORE CMD PACKET AFTER ERROR RECOV.
 (4)  012222  013737  003432  002314                                                       MOV     CMDSAV,C
3232  012230                                          ENDIF
 (4)  012230                                                                                50160$:
3233  012230  000207                          1$:    RTS     PC                    ;RETURN.
3234
```

```
3236                                    ;       ADDRESSES OF TCC HANDLING ROUTINES FOR TERMINATION CLASS CODES 0 - 7.
3237
3238  012232  012252                    TCCRA:  TCC0
3239  012234  012274                            TCC1
3240  012236  012312                            TCC2
3241  012240  012460                            TCC3
3242  012242  012502                            TCC4
3243  012244  013200                            TCC5
3244  012246  013302                            TCC6
3245  012250  013336                            TCC7
```

```
                                        ;       SUBROUTINE TO HANDLE TERM'NATION CLASS CODE 0, UNDEFINED SPECIAL
                                        ;       CONDITION ERROR.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:
                                        ;       CALLS:
                                        TCC0::  LET HRDCNT(R5) := HRDCNT(R5) + #1  ;UPDATE HARD ERROR COUNT.
                                                                                        INC     HRDCNT(R
                                                ERRHRD 5,SCERM,STAERM           ;REPORT SPECIAL CONDITION ERROR.
                                                                                        TRAP    C$ERHRD
                                                                                        .WORD   5
                                                                                        .WORD   SCERM
                                                                                        .WORD   STAERM
                                                JSR     PC,RAMDUM               ;GO DO RAM DUMP
                                                RTS PC                          ;RETURN.
                                        ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 1, ATTENTION CONDITION.
                                        ;       THIS TCC INDICATES THAT THE DRIVE HAS UNDERGONE A STATUS CHANGE
                                        ;       SUCH AS GOING OFFLINE OR COMING ONLINE.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R2,R4
                                        ;       CALLS:          DROPU
                                        TCC1::  ERRDF 6,ATTNM,STAERM            ;REPORT ATTENTION-UNIT OFF LINE.
                                                                                        TRAP    C$ERDF
                                                                                        .WORD   6
                                                                                        .WORD   ATTNM
                                                                                        .WORD   STAERM
                                                JSR     PC,RAMDUM               ;GO DO RAM DUMP
                                                RTS     PC                      ;RETURN.
```

```
3275                                    ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 2, TAPE STATUS ALERT.
3276                                    ;       A STATUS CONDITION HAS BEEN ENCOUNTERED THAT MAY HAVE SIGNIFICANCE
3277                                    ;       TO THE PROGRAM.  BITS OF INTEREST INCLUDE TMK, RLS, LET, RLL, BOT, EOT.
3278                                    ;       INPUTS:
3279                                    ;       OUTPUTS:
3280                                    ;       REGISTERS:
3281                                    ;       CALLS:
3282
3283  012312                            TCC2::    IF #X0.BOT SETIN MSGPKT+MS.XS0 ANDB EXPBOT NE #0 THEN
 (6)  012312  032737  000002  002346                                                          BIT     #X0.BOT,
 (9)  012320  001404                                                                        BEQ     50161$
 (6)  012322  105737  003522                                                                TSTB    EXPBOT
 (9)  012326  001401                                                                        BEQ     50161$
3284                                                                    ;IF AT BOT AND BOT IS EXPECTED:
3285  012330  000452                         BR TC2RTN                   ;RETURN-TCC2 CAUSED BY EXPECTED BOT.
3286  012332                              ENDIF
 (4)  012332                                                                            50161$:
3287  012332                            IF L$TEST EQ #3 THEN
 (6)  012332  023727  002114  000003                                                        CMP     L$TEST,#
 (9)  012340  001011                                                                        BNE     50162$
3288  012342                             IF PCMDWD EQ #WTM AND CMDWRD EQ #SRR THEN
 (6)  012342  023727  003434  100011                                                        CMP     PCMDWD,#
 (9)  012350  001005                                                                        BNE     50163$
 (6)  012352  023727  003430  104410                                                        CMP     CMDWRD,#
 (9)  012360  001001                                                                        BNE     50163$
3289  012362  000435                          BR    TC2RTN
3290  012364                             ENDIF
 (4)  012364                                                                            50163$:
3291  012364                            ENDIF
 (4)  012364                                                                            50162$:
3292  012364                              IF #X0.RLS!X0.RLL!X0.TMK!X0.LET!X0.BOT SETIN MSGPKT+MS.XS0 THEN
 (6)  012364  032737  170002  002346                                                          BIT     #X0.RLS!
 (9)  012372  001431                                                                        BEQ     50164$
3293                                                                    ;IF TCC2 CAUSED BY ANYTHING BUT EOT:
3294  012374                                IFB RANDOM EQ #0 ORB VFYFLG NE #0 THEN
 (6)  012374  105737  003523                                                                TSTB    RANDOM
 (8)  012400  001403                                                                        BEQ     50165$
 (6)  012402  105737  003524                                                                TSTB    VFYFLG
 (9)  012406  001423                                                                        BEQ     50166$
 (6)  012410                                                                            50165$:
3295                                                                    ;IF NOT IN RANDOM OR IF CMD IS WTV:
3296  012410                                  IFB IRE EQ #0 THEN            ;IF RFC ERROR REPORTS ARE ALLOWED:
 (6)  012410  105737  003527                                                                TSTB    IRE
 (9)  012414  001020                                                                        BNE     50167$
3297  012416                                    IFB ERRREC NE #0 THEN           ;IF WE ARE IN ERROR RECOVERY THE
 (6)  012416  105737  003477                                                                TSTB    ERRREC
 (9)  012422  001403                                                                        BEQ     50170$
3298  012424                                      LET UNREC :B= UNREC + #1        ;SET UNRECOVERABLE FLAG FOR LO
 (6)  012424  105237  003476                                                                INCB    UNREC
3299  012430                                    ELSE                          ;ELSE - IF NOT IN ERROR RECOVERY
 (4)  012430  000402                                                                        BR      50171$
 (3)  012432                                                                            50170$:
3300  012432                                      LET SCCNT(R5) := SCCNT(R5) + #1 ;INCREMENT THE SPEC COND COUNT
 (6)  012432  005265  003270                                                                INC     SCCNT(R5
3301  012436                                    ENDIF
 (4)  012436                                                                            50171$:
```

```
3302  012436                                        LET HRDCNT(R5) := HRDCNT(R5) + #1   ;UPDATE HARD ERROR COUNT.
 (6)  012436  005265  003310                                                             INC     HRDCNT(R
3303  012442                                        ERRHRD 7,TSAM,STAERM                ;REPORT TAPE STATUS ALERT.
 (4)  012442  104456                                                                     TRAP    C$ERHRD
 (5)  012444  000007                                                                     .WORD   7
 (5)  012446  004522                                                                     .WORD   TSAM
 (5)  012450  005642                                                                     .WORD   STAERM
3304  012452  004737  013360                            JSR     PC,RAMDUM               ;GO DO RAM DUMP
3305  012456                                          ENDIF
 (4)  012456                                                                          50167$:
3306  012456                                        ENDIF
 (4)  012456                                                                          50166$:
3307  012456                                      ENDIF
 (4)  012456                                                                          50164$:
3308  012456  000207                      TC2RTN:  RTS PC                          ;RETURN.
3309
3310
3311
3312
3313
3314
3315                                       ;       THE SPECIFIED FUNCTION WAS NOT INITIATED.  BITS OF INTEREST ARE
3316                                       ;       RMR, OFL, VCK, BOT, ILC, WLE, ILA, AND NBA.
3317                                       ;       INPUTS:
3318                                       ;       OUTPUTS:
3319                                       ;       REGISTERS:      R2,R4
3320                                       ;       CALLS:          DROPU
3321
3322  012460                               TCC3::  ERRDF 8,FUNRM,STAERM            ;REPORT FUNCTION REJECT.
 (4)  012460  104455                                                                     TRAP    C$ERDF
 (5)  012462  000010                                                                     .WORD   8
 (5)  012464  004437                                                                     .WORD   FUNRM
 (5)  012466  005642                                                                     .WORD   STAERM
3323  012470  004737  013360                      JSR     PC,RAMDUM               ;GO DO RAM DUMP
3324  012474  004737  016716                      JSR     PC,DROPU                ;DROP THE UNIT.
3325  012500  000207                              RTS PC                          ;RETURN.
```

```
3327                                    ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 4, RECOVERABLE ERROR.
3328                                    ;       TAPE POSITION IS ONE RECORD BEYOND WHAT ITS POSITION WAS WHEN
3329                                    ;       THE FUNCTION WAS INITIATED.  RECOVERY PROCEDURE IS TO LOG THE
3330                                    ;       ERROR AND ISSUE THE APPROPRIATE RETRY COMMAND.
3331                                    ;       2 WRITE-ERROR-RECOVERY ALGORITHMS CAN BE SELECTED:
3332                                    ;       THE FIRST ONE, VIA BADTSW SWITCH,  DOES DETECT BAD SPOTS ON TAPE.
3333                                    ;       IT CALLS A WRITE RETRY SUBR UNTIL THE RECORD IS RECOVERED
3334                                    ;       OR 20 BAD SPOTS HAVE BEEN LOGGED. ON REACHING 20 BAD
3335                                    ;       SPOTS LOGGED, A BAD TAPE OVERFLOW MSG IS PRINTED AND THE
3336                                    ;       UNIT DROPPED.
3337                                    ;       THE SECOND ALGORITHM ISSUES THE TU80 WRITE RETRY COMMAND
3338                                    ;       UP TO 16 TIMES BEFORE DROPPING THE UNIT OR PROCEEDING
3339                                    ;       WITH THE NEXT RECORD ON RECOVERY.
3340                                    ;       INPUTS:
3341                                    ;       OUTPUTS:
3342                                    ;       REGISTERS:      R2,R4.
3343                                    ;       CALLS:          RTLE, EXCUTE, GOWAIT, DROPU, WRTY
3344
3345  012502                            TCC4::  IF DEVTBL(R5) EQ #NINUSE THEN
 (6)  012502  026527  002536  177774                                                  CMP     DEVTBL(R
 (9)  012510  001003                                                                  BNE     50172$
3346  012512  000137  013176                    JMP     3$
3347  012516                            ELSE
 (4)  012516  000400                                                                  BR      50173$
 (3)  012520                                                                50172$:
3348  012520                            ENDIF
 (4)  012520                                                                50173$:
3349  012520                            IF CMDLG EQ #2 ANDB BADTSW NE #0 THEN
 (6)  012520  023727  003436  000002                                                  CMP     CMDLG,#2
 (9)  012526  001137                                                                  BNE     50174$
 (6)  012530  105737  002211                                                         TSTB    BADTSW
 (9)  012534  001534                                                                 BEQ     50174$
3350  012536                              IFB ERRREC EQ #0 ANDB ERCVER NE #0 THEN
 (6)  012536  105737  003477                                                         TSTB    ERRREC
 (9)  012542  001011                                                                 BNE     50175$
 (6)  012544  105737  002207                                                         TSTB    ERCVER
 (9)  012550  001406                                                                 BEQ     50175$
3351  012552                              ERRSOFT 9,RERM,STAERM ;
 (4)  012552  104457                                                                TRAP    C$ERSOFT
 (5)  012554  000011                                                                .WORD   9
 (5)  012556  004634                                                                .WORD   RERM
 (5)  012560  005642                                                                .WORD   STAERM
3352  012562  004737  013360               JSR   PC,RAMDUM             ;GO DO RAM DUMP
3353  012566                            ENDIF
 (4)  012566                                                                50175$:
3354  012566                            IFB IREC EQ #0 THEN             ;
 (6)  012566  105737  002210                                                         TSTB    IREC
 (9)  012572  001112                                                                 BNE     50176$
3355  012574                              LET ERRREC :B= ERRREC + #1  ;RETRY FLAG FOR EXCUTE SUBR: DON'T UPDAT
 (6)  012574  105237  003477                                                         INCB    ERRREC
3356  012600                              LET WRTYER :B= WRTYER + #1  ;REWRITE ERROR FLAG FOR WRTY SUBR
 (6)  012600  105237  003472                                                         INCB    WRTYER
3357  012604                              IFB WRTYFG EQ #0 THEN       ;FIRST RETRY ON THIS RECORD: SUBSEQUENT
 (6)  012604  105737  003471                                                         TSTB    WRTYFG
 (9)  012610  001102                                                                 BNE     50177$
3358                                                                    ;RETRIES WITH TCC4 ERRORS BY-PASS THIS S
```

```
3359  012612
 (4)  012612  013737  003430  014164
3360  012620
 (4)  012620  013737  002314  014162
3361  012626
 (4)  012626  013737  002322  014166
3362  012634
 (6)  012634  105237  003475
3363  012640
 (6)  012640  105237  003471
3364  012644
 (3)  012644
3365  012644
 (6)  012644  005265  003250
3366  012650
 (4)  012650  005037  003466
3367  012654
 (4)  012654  105037  003470
3368  012660  004737  013650
3369  012664
 (6)  012664  026527  002536  177774
 (9)  012672  001002
3370  012674  000540
3371  012676
 (4)  012676  000400
 (3)  012700
3372  012700
 (4)  012700
3373  012700
 (4)  012700  105737  003472
 (6)  012704  001404
 (4)  012706  027727  170606  000050
 (7)  012714  103753
 (4)  012716
3374
3375  012716
 (6)  012716  027727  170576  000050
 (9)  012724  103425
3376  012726
 (7)  012726  012746  014255
 (6)  012732  012746  000001
 (3)  012736  010600
 (4)  012740  104414
 (4)  012742  062706  000004
3377  012746  004737  014374
3378  012752
 (6)  012752  005365  003330
3379  012756  004737  013360
3380  012762  004737  016716
3381  012766
 (4)  012766  005065  003330
3382  012772
 (4)  012772  012775  002334  002456
3383  013000
 (4)  013000
3384  013000
```

```
LET WTYWRD := CMDWRD      ;SAVE WRITE COMMAND PACKET
                                                    MOV     CMDWRD,W
LET WTYCMD := CMDPKT      ;
                                                    MOV     CMDPKT,W
LET WTYBRF := CMDPKT+CP.CNT       ;
                                                    MOV     CMDPKT+C
LET RWERR :B= RWERR + #1  ;LOG SUBR FLAG: COUNT WRT ERRORS
                                                    INCB    RWERR
LET WRTYFG :B= WRTYFG + #1        ;RETRY IN PROGRESS FLAG
                                                    INCB    WRTYFG
REPEAT
                                                50200$:
  LET WRTYCT(R5) := WRTYCT(R5) + #1       ;COUNT GLOBAL WRITE RETR
                                                    INC     WRTYCT(R
  LET RETRYC := #0                ;CLEAR # OF RETRIES PER RECORD
                                                    CLR     RETRYC
  LET RPTCNT :B= #0               ;CLEAR # OF REPEATS
                                                    CLRB    RPTCNT
  JSR PC,WRTY             ;CALL WRITE RETRY
        IF DEVTBL(R5) EQ #NINUSE THEN
                                                    CMP     DEVTBL(R
                                                    BNE     50201$
  BR 3$
        ELSE
                                                    BR      50202$
                                                50201$:
        ENDIF
                                                50202$:
UNTILB WRTYER EQ #0 OR @BTPT HIS #40.     ;REPEAT RETRIES ON SAME
                                                    TSTB    WRTYER
                                                    BEQ     50203$
                                                    CMP     @BTPT,#4
                                                    BLO     50200$
                                                50203$:
                          ;UNTIL RECOVERED OR 20 BAD SPOTS
IF @BTPT HIS #40. THEN    ;WHEN 20 BAD SPOTS LOGGED
                                                    CMP     @BTPT,#4
                                                    BLO     50204$
  PRINTB #BTMSG2          ;PRINT BAD TAPE OVERFLOW MSG
                                                    MOV     #BTMSG2,
                                                    MOV     #1,-(SP)
                                                    MOV     SP,R0
                                                    TRAP    C$PNTB
                                                    ADD     #4,SP
  JSR PC,BORERS           ;ERASE BAD RECORD
  LET RECCNT(R5) := RECCNT(R5) - #1       ;
                                                    DEC     RECCNT(R
  JSR     PC,RAMDUM       ;GO DO RAM DUMP
  JSR     PC,DROPU        ;DROP THE UNIT.
  LET RECCNT(R5) :=  #0   ;
                                                    CLR     RECCNT(R
  LET @TSDB(R5) := #RWCPK ;REWIND UNIT
                                                    MOV     #RWCPK,@
ENDIF
                                                50204$:
LET WRTYFG :B= #0         ;RETRY COMPLETE FLAG
```

```
  (4)  013000  105037  003471                                                    CLRB    WRTYFG
3385   013004                        LET MISCFG :B= MISCFG + #1        ;DO NOT HALT ON THIS CMD FLG
  (6)  013004  105237  003541                                                    INCB    MISCFG
3386   013010                        LET PCMDWD := WTYWRD      ;RESTORE ORIGINAL WRT CMD AFTER RECOVERY
  (4)  013010  013737  014164  003434                                           MOV     WTYWRD,P
3387   013016                      ENDIF
  (4)  013016                                                          50177$:
3388   013016                    ELSE
  (4)  013016  000402                                                            BR      50205$
  (3)  013020                                                          50176$:
3389   013020                      LET UNREC :B= UNREC + #1    ;
  (6)  013020  105237  003476                                                    INCB    UNREC
3390   013024                      ENDIF
  (4)  013024                                                          50205$:
3391   013024                    ELSE
  (4)  013024  000464                                                            BR      50206$
  (3)  013026                                                          50174$:
3392   013026  004737  013512    JSR PC,RTLE                     ;CHECK FOR RETRY LIMIT EXCEEDED.
3393   013032                    IF CMDLG GT #2 THEN             ;IF READ CMD THEN:
  (6)  013032  023727  003436  000002                                           CMP     CMDLG,#2
  (9)  013040  003411                                                          BLE     50207$
3394   013042                      LET R2 := #RRECL SHIFT -1   ;R2=READ RETRY COUNT LIMIT / 2
  (4)  013042  012702  000020                                                  MOV     #RRECL,R
  (7)  013046  006202                                                          ASR     R2
3395   013050                      IF RETRYC GE R2 THEN                ;IF RETRY COUNT IS MORE THAN HAL
  (6)  013050  023702  003466                                                  CMP     RETRYC,R
  (9)  013054  002403                                                          BLT     50210$
3396   013056                        LET CMDPKT := CMDPKT SET.BY #OPP.C        ;SET OPPOSITE BIT FOR RE
  (6)  013056  052737  020000  002314                                          BIS     #OPP.C,C
3397   013064                      ENDIF
  (4)  013064                                                          50210$:
3398   013064                    ENDIF
  (4)  013064                                                          50207$:
3399   013064                    IF RETRYC EQ #0 ANDB ERCVER NE #0 THEN  ;IF THIS IS THE ORIGINAL ERROR
  (6)  013064  005737  003466                                                  TST     RETRYC
  (9)  013070  001011                                                          BNE     50211$
  (6)  013072  105737  002207                                                  TSTB    ERCVER
  (9)  013076  001406                                                          BEQ     50211$
3400   013100                    ERRSOFT 9,RERM,STAERM           ;REPORT RECOVERABLE ERROR
  (4)  013100  104457                                                          TRAP    C$ERSOFT
  (5)  013102  000011                                                          .WORD   9
  (5)  013104  004634                                                          .WORD   RERM
  (5)  013106  005642                                                          .WORD   STAERM
3401   013110  004737  013360    JSR   PC,RAMDUM              ;GO DO RAM DUMP
3402   013114                    ENDIF                         ;PROVIDED OPERATOR HAS ENABLED THE REPOR
  (4)  013114                                                          50211$:
3403   013114                    LET RETRYC := RETRYC + #1      ;UPDATE RETRY COUNT.
  (6)  013114  005237  003466                                                  INC     RETRYC
3404   013120                    LET CMDPKT := CMDPKT SET.BY #MOD.C1   ;SET RETRY BIT IN CMD PACKET.
  (6)  013120  052737  001000  002314                                          BIS     #MOD.C1,
3405   013126                    IFB IREC EQ #0 THEN           ;IF ERROR RECOVERY ENABLED:
  (6)  013126  105737  002210                                                  TSTB    IREC
  (9)  013132  001017                                                          BNE     50212$
3406   013134                              IF DEVTBL(R5) EQ #NINUSE THEN
  (6)  013134  026527  002536  177774                                          CMP     DEVTBL(R
  (9)  013142  001002                                                          BNE     50213$
```

```
3407  013144  000414                                    BR 3$
3408  013146                                                  ELSE
 (4)  013146  000400                                                    BR      50214$
 (3)  013150                                                        50213$:
3409  013150                                                  ENDIF
 (4)  013150                                                        50214$:
3410  013150                                    LET ERRREC :B= ERRREC + #1  ;SET ERROR RECOVERY FLAG.
 (6)  013150  105237  003477                                               INCB    ERRREC
3411  013154                                    POP R2,R2                  ;POP 2 RTN ADRS FROM STACK.
 (2)  013154  012602                                                       MOV     (SP)+,R2
 (3)  013156  012602                                                       MOV     (SP)+,R2
3412  013160  004737  010576                    JSR PC,EXCUTE                    ;GO EXECUTE THE RETRY COMMAND.
3413  013164  000137  011166                    JMP GOWAIT                 ;GO WAIT FOR INTERRUPT + CHECK STATUS.
3414  013170                                  ELSE                         ;ELSE IF ERROR RECOVERY IS NOT ENABLED:
 (4)  013170  000402                                                       BR      50215$
 (3)  013172                                                        50212$:
3415  013172                                    LET UNREC :B= UNREC + #1    ;SET UNRECOVERABLE ERROR FLAG.
 (6)  013172  105237  003476                                               INCB    UNREC
3416  013176                                  ENDIF
 (4)  013176                                                        50215$:
3417  013176                                ENDIF
 (4)  013176                                                        50206$:
3418  013176  000207                3$:      RTS PC                     ;RETURN
```

```
3420                                    ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 5, RECOVERABLE ERROR.
3421                                    ;       TAPE POSITION HAS NOT CHANGED.  RECOVERY PROCEDURE IS TO LOG THE
3422                                    ;       ERROR AND RE-ISSUE THE ORIGINAL COMMAND.
3423                                    ;       INPUTS:
3424                                    ;       OUTPUTS:
3425                                    ;       REGISTERS:      R2,R4.
3426                                    ;       CALLS:          RTLE, EXCUTE, GOWAIT, DROPU.
3427
3428  013200  004737  013512              TCC5::  JSR PC,RTLE                     ;CHECK FOR RETRY LIMIT EXCEEDED
3429  013204                                      IF RETRYC EQ #0 THEN            ;IF THIS IS THE ORIGINAL ERROR THEN:
 (6)  013204  005737  003466                                                            TST     RETRYC
 (9)  013210  001006                                                                    BNE     50216$
3430  013212                                        ERRSOFT 10,RERM,STAERM        ;REPORT RECOVERABLE ERROR.
 (4)  013212  104457                                                                    TRAP    C$ERSOFT
 (5)  013214  000012                                                                    .WORD   10
 (5)  013216  004634                                                                    .WORD   RERM
 (5)  013220  005642                                                                    .WORD   STAERM
3431  013222  004737  013360                      JSR     PC,RAMDUM               ;GO DO RAM DUMP
3432  013226                                      ENDIF
 (4)  013226                                                                                    50216$:
3433  013226                                      LET RETRYC := RETRYC + #1        ;UPDATE RETRY COUNTER.
 (6)  013226  005237  003466                                                            INC     RETRYC
3434  013232                                      IFB IREC EQ #0 THEN             ;IF ERROR RECOVERY IS ENABLED:
 (6)  013232  105737  002210                                                            TSTB    IREC
 (9)  013236  001016                                                                    BNE     50217$
3435  013240                                        LET ERRREC :B= ERRREC + #1     ;SET ERROR RECOVERY FLAG.
 (6)  013240  105237  003477                                                            INCB    ERRREC
3436  013244                                        LET RECCNT(R5) := RECCNT(R5) + #1      ;UPDATE REC COUNT
 (6)  013244  005265  003330                                                            INC     RECCNT(R
3437  013250                                        LET @DATAWT := RECCNT(R5)              ;AND INSERT IT INTO WRT BFR
 (4)  013250  016577  003330  170140                                                    MOV     RECCNT(R
3438  013256                                        POP R2,R2                     ;POP 2 RTN ADRS FROM STACK.
 (2)  013256  012602                                                                    MOV     (SP)+,R2
 (3)  013260  012602                                                                    MOV     (SP)+,R2
3439  013262  004737  010576                        JSR PC,EXCUTE                 ;GO RE-ISSUE THE COMMAND.
3440  013266  000137  011166                        JMP GOWAIT                    ;GO WAIT FOR INTERRUPT + CHECK STATUS.
3441  013272                                      ELSE                            ;ELSE IF ERROR RECOVERY IS NOT ENABLED:
 (4)  013272  000402                                                                    BR      50220$
 (3)  013274                                                                                    50217$:
3442  013274                                        LET UNREC :B= UNREC + #1      ;SET UNRECOVERABLE ERROR FLAG.
 (6)  013274  105237  003476                                                            INCB    UNREC
3443  013300                                      ENDIF
 (4)  013300                                                                                    50220$:
3444  013300  000207                             RTS PC                          ;RETURN.
3445
3446
```

```
3448                                    ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 6, UNRECOVERABLE ERROR.
3449                                    ;       TAPE POSITION HAS BEEN LOST.  THE ONLY VALID RECOVERY PROCEDURE
3450                                    ;       IS TO REWIND AND START OVER AT BOT UNLESS THE TAPE HAS LABELS OR
3451                                    ;       SEQUENCE NUMBERS.  THIS DIAGNOSTIC WILL REWIND AND RETRY THE
3452                                    ;       COMMAND ONLY IF DENSITY CHECK IS SET, OTHERWISE THE UNIT WILL BE
3453                                    ;       DROPPED FROM THE TEST SEQUENCE.
3454                                    ;       INPUTS:
3455                                    ;       OUTPUTS:
3456                                    ;       REGISTERS:      R2, R4
3457                                    ;       CALLS:          RTLE, WSSR, EXCUTE, GOWAIT, DROPU
3458
3459  013302                            TCC6::  LET @TSDB(R5) := #RWCPK         ;ISSUE A REWIND COMMAND,
 (4)  013302  012775  002334  002456                                                   MOV     #RWCPK,@
3460  013310  004737  011516                    JSR PC,WSSR                     ;WAIT FOR SUBSYSTEM READY,
3461  013314                                   ERRDF 11,URERM,STAERM           ;REPORT UNRECOVERABLE ERROR.
 (4)  013314  104455                                                             TRAP    C$ERDF
 (5)  013316  000013                                                             .WORD   11
 (5)  013320  004656                                                             .WORD   URERM
 (5)  013322  005642                                                             .WORD   STAERM
3462  013324  004737  013360                    JSR     PC,RAMDUM               ;GO DO RAM DUMP
3463  013330  004737  016716                    JSR     PC,DROPU                ;DROP THE UNIT.
3464  013334  000207                            RTS PC                          ;RETURN
```

```
                                        ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 7, FATAL SUBSYSTEM
                                        ;       ERROR.  THE SUBSYSTEM IS INCAPABLE OF PROPERLY PERFORMING
                                        ;       COMMANDS OR AT LEAST ITS INTEGRITY IS SERIOUSLY QUESTIONABLE.
                                        ;       REFER TO THE FATAL CLASS CODE FIELD IN THE TSSR REGISTER FOR
                                        ;       ADDITIONAL INFORMATION ON THE TYPE OF FATAL ERROR.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R2, R4
                                        ;       CALLS:

013336                                  TCC7::  ERRDF 12,FATSM,STAERM           ;REPORT FATAL SUBSYSTEM ERROR.
(4) 013336  104455                                                                      TRAP    C$ERDF
(5) 013340  000014                                                                      .WORD   12
(5) 013342  004457                                                                      .WORD   FATSM
(5) 013344  005642                                                                      .WORD   STAERM
013346  004737  013360                          JSR     PC,RAMDUM               ;GO DO RAM DUMP
013352  004737  016716                          JSR     PC,DROPU                ;DROP THE UNIT.
013356  000207                                  RTS PC                          ;RETURN.


013360                                  RAMDUM::IFB RAMWRT NE #0 THEN
(6) 013360  105737  002214                                                             TSTB    RAMWRT
(9) 013364  001452                                                                      BEQ     50221$
013366                                          PRINTX  #RAMFHR
(7) 013366  012746  005310                                                              MOV     #RAMFHR,
(6) 013372  012746  000001                                                              MOV     #1,-(SP)
(3) 013376  010600                                                                      MOV     SP,R0
(4) 013400  104415                                                                      TRAP    C$PNTX
(4) 013402  062706  000004                                                              ADD     #4,SP
013406  012737  000010  003406                  MOV     #8.,RAMSIZ      ;RAM FIELD IS 8 BYTES LONG
013414  012737  000020  003342                  MOV     #20,RAMHLD      ;FIELD STARTS AT 20 OCTAL (10 HEX)
013422  004737  015164                          JSR     PC,RAMER        ;READ AND PRINT THEM
013426  012737  000040  003342                  MOV     #40,RAMHLD      ;FIELD STARTS AT 40 OCTAL (20 HEX)
013434  004737  015164                          JSR     PC,RAMER        ;READ AND PRINT THEM
013440  012737  000060  003342                  MOV     #60,RAMHLD      ;FIELD STARTS AT 60 OCTAL (30 HEX)
013446  004737  015164                          JSR     PC,RAMER        ;READ AND PRINT THEM
013452  012737  000020  003406                  MOV     #16.,RAMSIZ     ;RAM FIELD IS SIXTEEN BYTES LONG
013460  012737  000100  003342                  MOV     #100,RAMHLD     ;FIELD STARTS AT 100 OCTAL (40 HEX)
013466  004737  015164                          JSR     PC,RAMER        ;READ AND PRINT THEM
013472                                          PRINTX  #RAMLIN
(7) 013472  012746  005464                                                              MOV     #RAMLIN,
(6) 013476  012746  000001                                                              MOV     #1,-(SP)
(3) 013502  010600                                                                      MOV     SP,R0
(4) 013504  104415                                                                      TRAP    C$PNTX
(4) 013506  062706  000004                                                              ADD     #4,SP
013512                                          ENDIF
(4) 013512                                                                      50221$:


                                        ;       SUBROUTINE TO CHECK FOR RETRY LIMIT EXCEEDED.  PRINTS ERROR MESSAGE
                                        ;       IF EXCEEDED AND DROP UNIT UNLESS COMMAND IS A READ.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R2, R4.
```

```
3505                                    ;       CALLS:          DROPU
3506
3507  013512                            RTLE::  IF CMDLG EQ #0 THEN             ;IF CMD IS NOT A READ OR WRITE THEN:
 (6)  013512  005737  003436                                                            TST     CMDLG
 (9)  013516  001012                                                                    BNE     50222$
3508  013520                                    ERRDF 11,URERM,STAERM             ;REPORT UNRECOVERABLE ERROR.
 (4)  013520  104455                                                                    TRAP    C$ERDF
 (5)  013522  000013                                                                    .WORD   11
 (5)  013524  004656                                                                    .WORD   URFRM
 (5)  013526  005642                                                                    .WORD   STAERM
3509  013530  004737  013360                    JSR     PC,RAMDUM               ;GO DO RAM DUMP
3510  013534  004737  016716                    JSR     PC,DROPU                ;DROP THE UNIT.
3511  013540                                    POP R2
 (2)  013540  012602                                                                    MOV     (SP)+,R2
3512  013542  000441                           BR RTLRTN                       ;AND RETURN.
3513  013544                                    ENDIF
 (4)  013544                                                                    50222$:
3514  013544                                    LET RWERR :B= RWERR + #1        ;SET READ/WRITE ERROR FLAG.
 (6)  013544  105237  003475                                                            INCB    RWERR
3515  013550                                    IF CMDLG EQ #2 THEN             ;IF CMD IS A WRT OR WTM:
 (6)  013550  023727  003436  000002                                                    CMP     CMDLG,#2
 (9)  013556  001020                                                                    BNE     50223$
3516  013560                                      IF RETRYC EQ #WRECL THEN      ;IF RETRY COUNT HAS REACHED LIMIT:
 (6)  013560  023727  003466  000020                                                    CMP     RETRYC,#
 (9)  013566  001013                                                                    BNE     50224$
3517  013570                                       LET UNREC :B= UNREC + #1    ;SET UNRECOVERABLE FLAG
 (6)  013570  105237  003476                                                            INCB    UNREC
3518  013574                                       ERRDF 14,RLEXM,STAERM       ;REPORT RETRY LIMIT EXCEEDED.
 (4)  013574  104455                                                                    TRAP    C$ERDF
 (5)  013576  000016                                                                    .WORD   14
 (5)  013600  004374                                                                    .WORD   RLEXM
 (5)  013602  005642                                                                    .WORD   STAERM
3519  013604  004737  013360                       JSR  PC,RAMDUM           ;GO DO RAM DUMP
3520  013610  004737  016716                       JSR  PC,DROPU            ;DROP THE UNIT.
3521  013614                                       POP  R2
 (2)  013614  012602                                                                    MOV     (SP)+,R2
3522  013616                                      ENDIF
 (4)  013616                                                                    50224$:
3523  013616                                    ELSE                            ;ELSE - CMD IS A READ:
 (4)  013616  000413                                                                    BR      50225$
 (3)  013620                                                                    50223$:
3524  013620                                      IF RETRYC EQ #RRECL THEN      ;IF RETRY COUNT HAS REACHED LIMIT:
 (6)  013620  023727  003466  000020                                                    CMP     RETRYC,#
 (9)  013626  001007                                                                    BNE     50226$
3525  013630                                       LET UNREC :B= UNREC + #1    ;SET UNRECOVERABLE FLAG
 (6)  013630  105237  003476                                                            INCB    UNREC
3526  013634                                       ERRHRD 14,RLEXM,STAERM      ;REPORT RECOVERABLE ERROR.
 (4)  013634  104456                                                                    TRAP    C$ERHRD
 (5)  013636  000016                                                                    .WORD   14
 (5)  013640  004374                                                                    .WORD   RLEXM
 (5)  013642  005642                                                                    .WORD   STAERM
3527  013644                                       POP R2
 (2)  013644  012602                                                                    MOV     (SP)+,R2
3528  013646                                      ENDIF
 (4)  013646                                                                    50226$:
3529  013646                                    ENDIF
```

```
   (4)  013646
3530  013646  000207          RTLRTN: RTS PC          ;RETURN          50225$:
```

```
                                        ;       SUBR TO REWRITE A BAD, BUT RECOVERABLE WRITTEN RECORD.
                                        ;       REWRITE RECORD ON SAME SPOT: REPEAT 4 TIMES.
                                        ;       IF ALL 4 REPEATS GOOD, RECORD IS RECOVERED
                                        ;       AND A RECOVERABLE WRITE ERROR IS LOGGED.
                                        ;       IF ANY OF 4 REPEATS BAD, ERASE BAD RECORD, LOG SUSPECTED
                                        ;       BAD SPOT, RETRY AGAIN. RETRY 4 TIMES, UP TO 4 REPEATS EACH.
                                        ;       IF RECORD NOT GOOD AFTER 4 RETRIES, ERASE IT, EXIT WITH
                                        ;       ERROR FLAG WRTYER SET, PRINTING RETRY FAILED.
                                        ;       THIS ALL SCHEME IS REENTERED 20 TIMES MAX, IE 20 BAD
                                        ;       SPOTS MAX ARE ALLOWED.
                                        ;
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R3,R4
                                        ;       CALLS:          BORERS, REWRT
                                        ;
013650                                  WRTY:: IF DEVTBL(R5) NE #NINUSE THEN            ;IF DRIVE NOT DROPPED
(6) 013650  026527  002536  177774                                                              CMP     DEVTBL(R
(9) 013656  001540                                                                              BEQ     50227$
013660                                          BEGIN RETRY
013660                                            REPEAT
(3) 013660                                                                                  50231$:
013660                                              BEGIN REPEAT
013660                                                REPEAT
(3) 013660                                                                                  50233$:
013660  004737  014374                                  JSR PC,BORERS                   ;BACKSPACE/ERASE ONE RECORD
013664                                                LET WRTYER :B= #0                ;CLEAR WRITE RETRY ERROR
(4) 013664  105037  003472                                                                      CLRB    WRTYER
013670  004737  014550                                  JSR PC,REWRT                    ;REWRITE RECORD ON SAME SPOT
013674                                                IF DEVTBL(R5) EQ #NINUSE THEN
(6) 013674  026527  002536  177774                                                              CMP     DEVTBL(R
(9) 013702  001004                                                                              BNE     50234$
013704                                                  LET RPTCNT :B= #3
(4) 013704  112737  000003  003470                                                              MOVB    #3,RPTCN
013712                                                ELSE
(4) 013712  000400                                                                              BR      50235$
(3) 013714                                                                                  50234$:
013714                                                ENDIF
(4) 013714                                                                                  50235$:
013714                                                LET RPTCNT :B= RPTCNT + #1       ;COUNT REPEATS
(6) 013714  105237  003470                                                                      INCB    RPTCNT
013720                                              UNTILB RPTCNT EQ #4 ORB WRTYER NE #0      ;LIMIT: 4 REPEATS OR REC
(4) 013720  123727  003470  000004                                                              CMPB    RPTCNT,#
(6) 013726  001403                                                                              BEQ     50236$
(4) 013730  105737  003472                                                                      TSTB    WRTYER
(7) 013734  001751                                                                              BEQ     50233$
(4) 013736                                                                                  50236$:
013736                                              END REPEAT                       ;
(3) 013736                                                                                  50232$:
013736                                              LET RETRYC := RETRYC + #1         ;COUNT RETRIES
(6) 013736  005237  003466                                                                      INC     RETRYC
013742                                                IF DEVTBL(R5) EQ #NINUSE THEN
(6) 013742  026527  002536  177774                                                              CMP     DEVTBL(R
(9) 013750  001002                                                                              BNE     50237$
013752  000502                                        BR      3$
013754                                                ELSE
```

```
  (4)  013754  000400                                                                  BR      50240$
  (3)  013756                                                                       50237$:
3567   013756                                                                         ENDIF
  (4)  013756                                                                       50240$:
3568   013756                                                  IFB WRTYER EQ #0 THEN      ;
  (6)  013756  105737  003472                                                          TSTB    WRTYER
  (9)  013762  001001                                                                  BNE     50241$
3569   013764                                                    LEAVE RETRY          ;EXIT RETRY LOOP IF RECOVERED
  (4)  013764  000457                                                                  BR      50230$
3570   013766                                                  ELSE                       ;
  (3)  013766                                                                       50241$:
3571   013766                                                    IFB ERCVER NE #0 THEN    ;
  (6)  013766  105737  002207                                                          TSTB    ERCVER
  (9)  013772  001415                                                                  BEQ     50243$
3572   013774                                                      PRINTB #BTMSG1,RETRYC,<B,RPTCNT>   ;PRINT SUSPECTED BAD SPO
  (9)  013774  005046                                                                  CLR     -(SP)
  (9)  013776  153716  003470                                                          BISB    RPTCNT,(
  (8)  014002  013746  003466                                                          MOV     RETRYC,-
  (7)  014006  012746  014170                                                          MOV     #BTMSG1,
  (6)  014012  012746  000003                                                          MOV     #3,-(SP)
  (3)  014016  010600                                                                  MOV     SP,R0
  (4)  014020  104414                                                                  TRAP    C$PNTB
  (4)  014022  062706  000010                                                          ADD     #10,SP
3573   014026                                                    ENDIF                    ;
  (4)  014026                                                                       50243$:
3574   014026                                                    IF RETRYC EQ #1 THEN     ;ON FIRST RETRY, LOGG BAD SPOT
  (6)  014026  023727  003466  000001                                                  CMP     RETRYC,#
  (9)  014034  001021                                                                  BNE     50244$
3575   014036                                                      LET BTPT := BTADDR(R5)   ;BTPT IS BOTH THE BAD SPOT COUNT
  (4)  014036  016537  002550  003520                                                  MOV     BTADDR(R
3576   014044                                                      LET R4 := @BTPT + #2     ;AND THE LOGGING INDEX
  (4)  014044  017704  167450                                                          MOV     @BTPT,R4
  (6)  014050  062704  000002                                                          ADD     #2,R4
3577   014054                                                      LET @BTPT := R4          ;
  (4)  014054  010477  167440                                                          MOV     R4,@BTPT
3578   014060                                                      IF R4 LOS #40. THEN      ;
  (6)  014060  020427  000050                                                          CMP     R4,#40.
  (9)  014064  101005                                                                  BHI     50245$
3579   014066                                                        LET R3 := BTPT         ;STORE FIRST 20 BAD SPOTS
  (4)  014066  013703  003520                                                          MOV     BTPT,R3
3580   014072                                                        LET R4 := R4 + R3      ;
  (6)  014072  060304                                                                  ADD     R3,R4
3581   014074                                                        LET (R4) := RECCNT(R5) ;
  (4)  014074  016514  003330                                                          MOV     RECCNT(R
3582   014100                                                      ENDIF
  (4)  014100                                                                       50245$:
3583   014100                                                    ENDIF                    ;
  (4)  014100                                                                       50244$:
3584   014100                                                    LET ERSFLG :B= ERSFLG + #1   ;ERASE FLAG TO ERASE BAD RECORD
  (6)  014100  105237  003534                                                          INCB    ERSFLG
3585   014104                                                    LET RWERR :B= #0         ;CANCELL "LOG" ERROR FLAG ON FAI
  (4)  014104  105037  003475                                                          CLRB    RWERR
3586   014110                                                    LET RPTCNT :B= #0        ;CLEAR REPEAT COUNT FOR NEXT RET
  (4)  014110  105037  003470                                                          CLRB    RPTCNT
3587   014114                                                  ENDIF                      ;
  (4)  014114                                                                       50242$:
```

```
3588  014114                                    UNTIL RETRYC EQ #4                ;LIMIT: 4 RETRIES
 (3)  014114  023727  003466  000004                                                    CMP     RETRYC,#
 (6)  014122  001256                                                                    BNE     50231$
3589  014124                                  END RETRY                         ;
 (3)  014124                                                                  50230$:
3590  014124                                  IFB WRTYER NE #0 THEN             ;
 (6)  014124  105737  003472                                                           TSTB    WRTYER
 (9)  014130  001413                                                                   BEQ     50246$
3591  014132                                    IFB ERCVER NE #0 THEN           ;
 (6)  014132  105737  002207                                                           TSTB    ERCVER
 (9)  014136  001410                                                                   BEQ     50247$
3592  014140                                      PRINTB #BTMSG3                ;PRINT RETRY FAILED
 (7)  014140  012746  014325                                                           MOV     #BTMSG3,
 (6)  014144  012746  000001                                                           MOV     #1,-(SP)
 (3)  014150  010600                                                                   MOV     SP,R0
 (4)  014152  104414                                                                   TRAP    C$PNTB
 (4)  014154  062706  000004                                                           ADD     #4,SP
3593  014160                                    ENDIF
 (4)  014160                                                                  50247$:
3594  014160                                  ENDIF
 (4)  014160                                                                  50246$:
3595  014160                                ENDIF
 (4)  014160                                                                  50227$:
3596  014160  000207                     3$:     RTS PC
3597
3598
3599
3600
3601
3602
3603  014162  000000                     WTYCMD: .WORD   0               ;STORAGE FOR WRITE CMD WHILE RETRYING
3604  014164  000000                     WTYWRD: .WORD   0               ;STORAGE FOR WRITE CMD WORD WHILE RETRYING
3605  014166  000000                     WTYBRF: .WORD   0               ;STORAGE FOR WRITE BPCR WHILE RETRYING
3606
3607
3608  014170  040445  052523  050123    BTMSG1: .ASCIZ  /%ASUSPECT BAD SPOT AFTER %D1%A RETRY, %D1%A REPEAT%N/
      014176  041505  020124  040502
      014204  020104  050123  052117
      014212  040440  052106  051105
      014220  022440  030504  040445
      014226  051040  052105  054522
      014234  020054  042045  022461
      014242  020101  042522  042520
      014250  052101  047045     000
3609  014255     045  022516  041101    BTMSG2: .ASCIZ  /%N%ABAD TAPE OVERFLOW: CHANGE TAPE!%N%N/
      014262  042101  052040  050101
      014270  020105  053117  051105
      014276  046106  053517  020072
      014304  044103  047101  042507
      014312  052040  050101  020505
      014320  047045  047045     000
3610  014325     045  051101  052105    BTMSG3: .ASCIZ  /%ARETRY FAILED ON BAD SPOT...ERASED!%N/
      014332  054522  043040  044501
      014340  042514  020104  047117
      014346  041040  042101  051440
      014354  047520  027124  027056
```

```
        014362  051105  051501  042105
        014370  022441  000116
  3611                                  .EVEN
```

```
3613                                    ;       SUBR TO BACSPACE ONE RECORD
3614                                    ;       IF THE ERASE FLAG IS SET, THEN ERASE THAT RECORD
3615                                    ;       INPUTS:         ERSFLG  1 = DO ERASE
3616                                    ;       OUTPUTS:
3617                                    ;       REGISTERS:
3618                                    ;       CALLS:          EXCUTE, GOWAIT, CKHAE
3619
3620  014374                            BORERS:: LET PCMDWD := CMDWRD   ;SET COMMAND  TO SPACE REV
 (4)  014374  013737  003430  003434                                                    MOV     CMDWRD,P
3621  014402                                    LET CMDWRD := #SRR      ;
 (4)  014402  012737  104410  003430                                                    MOV     #SRR,CMD
3622  014410                                    LET CMDPKT := CMDWRD CLR.BY #BRF.C      ;
 (4)  014410  013737  003430  002314                                                    MOV     CMDWRD,C
 (6)  014416  042737  004000  002314                                                    BIC     #BRF.C,C
3623  014424                                    LET CMDSAV := CMDPKT    ;
 (4)  014424  013737  002314  003432                                                    MOV     CMDPKT,C
3624  014432                                    LET CMDPKT+CP.ADL := #1 ;
 (4)  014432  012737  000001  002316                                                    MOV     #1,CMDPK
3625  014440                                    LET CMDLG := #0         ;
 (4)  014440  005037  003436                                                            CLR     CMDLG
3626  014444  004737  007614                   JSR PC,CMDAC            ;
3627  014450  004737  010576                   JSR PC,EXCUTE           ;
3628  014454  004737  011166                   JSR PC,GOWAIT           ;
3629  014460  004737  017222                   JSR PC,CKHAE            ;
3630  014464                                    IFB ERSFLG NE #0 THEN   ;WHEN ERASE FLAG IS SET, DO ERASE
 (6)  014464  105737  003534                                                            TSTB    ERSFLG
 (9)  014470  001426                                                                    BEQ     50250$
3631  014472                                      LET PCMDWD := CMDWRD  ;
 (4)  014472  013737  003430  003434                                                    MOV     CMDWRD,P
3632  014500                                      LET CMDWRD := #ERS    ;
 (4)  014500  012737  100411  003430                                                    MOV     #ERS,CMD
3633  014506                                      LET CMDPKT := CMDWRD  ;
 (4)  014506  013737  003430  002314                                                    MOV     CMDWRD,C
3634  014514                                      LET CMDSAV := CMDPKT  ;
 (4)  014514  013737  002314  003432                                                    MOV     CMDPKT,C
3635  014522  004737  007614                     JSR PC,CMDAC          ;
3636  014526  004737  010576                     JSR PC,EXCUTE
3637  014532  004737  011166                     JSR PC,GOWAIT
3638  014536  004737  017222                     JSR PC,CKHAE
3639  014542                                      LET ERSFLG :B= #0
 (4)  014542  105037  003534                                                            CLRB    ERSFLG
3640  014546                                    ENDIF
 (4)  014546                                                                  50250$:
3641  014546  000207                           RTS PC
3642                                    ;       SUBR TO REWRITE A BADLY WRITTEN RECORD
3643
3644  014550                            REWRT:  IF DEVTBL(R5) NE #NINUSE THEN   ;IF DRIVE NOT DROPPED
 (6)  014550  026527  002536  177774                                                    CMP     DEVTBL(R
 (9)  014556  001441                                                                    BEQ     50251$
3645  014560                                    LET PCMDWD := CMDWRD    ;RESTORE WRITE COMMAND PACKET
 (4)  014560  013737  003430  003434                                                    MOV     CMDWRD,P
3646  014566                                    LET CMDWRD := WTYWRD    ;
 (4)  014566  013737  014164  003430                                                    MOV     WTYWRD,C
3647  014574                                    LET CMDPKT := WTYCMD    ;
 (4)  014574  013737  014162  002314                                                    MOV     WTYCMD,C
3648  014602                                    LET CMDSAV := CMDPKT    ;
```

```
  (4)  014602  013737  002314  003432                                                    MOV     CMDPKT,C
3649   014610
                                    LET CMDPKT+CP.ADL := DATAWT     ;
  (4)  014610  013737  003416  002316                                                    MOV     DATAWT,C
3650   014616
                                    LET CMDPKT+CP.CNT := WTYBRF     ;
  (4)  014616  013737  014166  002322                                                    MOV     WTYBRF,C
3651   014624
                                    LET CMDLG := #2                 ;
  (4)  014624  012737  000002  003436                                                    MOV     #2,CMDLG
3652   014632  004737  007614          JSR PC,CMDAC
3653   014636  004737  010576          JSR PC,EXCUTE                  ;RE-WRITE RECORD
3654   014642            IF DEVTBL(R5) NE #NINUSE THEN
  (6)  014642  026527  002536  177774                                                    CMP     DEVTBL(R
  (9)  014650  001404                                                                    BEQ     50252$
3655   014652  004737  011166          JSR PC,GOWAIT                  ;
3656   014656  004737  017222          JSR PC,CKHAE                   ;
3657   014662            ENDIF
  (4)  014662                                                                  50252$:
3658   014662                          ENDIF
  (4)  014662                                                                  50251$:
3659   014662  000207                  RTS PC
```

```
3661                                    ;       SUBROUTINE TO LOG BYTES READ/WRITTEN.
3662                                    ;       ALSO UPDATES READ/WRITE ERROR COUNTERS.
3663                                    ;       INPUTS:
3664                                    ;       OUTPUTS:
3665                                    ;       REGISTERS:      R2, R3, R4.
3666                                    ;       CALLS:
3667
3668  014664                            LOG::   IFB ERLOG EQ #0 THEN            ;IF DATA AND ERRORS HAVE NOT BEEN LOGGED
 (6)  014664  105737  003474                                                            TSTB    ERLOG
 (9)  014670  001126                                                                    BNE     50253$
3669  014672                                    LET ERLOG :B= ERLOG + #1       ;SET LOG DONE FLAG.
 (6)  014672  105237  003474                                                            INCB    ERLOG
3670  014676                                    LET R4 := CMDLG                ;GET CURRENT CMD LOGGING CODE.
 (4)  014676  013704  003436                                                            MOV     CMDLG,R4
3671  014702                                    IF R4 NE #0 THEN               ;IF THERE IS A CODE THEN:
 (6)  014702  005704                                                                    TST     R4
 (9)  014704  001520                                                                    BEQ     50254$
3672  014706                                      LET R4 := R4 - #2            ;ADJUST THE CODE FOR TABLE INDEX.
 (6)  014706  162704  000002                                                            SUB     #2,R4
3673  014712                                      LET R2 := R5 + BINC(R4) + #CNTBGN  ;R2 = ADR OF BYTE COUNT LSW.
 (4)  014712  010502                                                                    MOV     R5,R2
 (6)  014714  066402  015150                                                            ADD     BINC(R4)
 (7)  014720  062702  002560                                                            ADD     #CNTBGN,
3674  014724                                      LET (R2) := (R2) + BRFCNT      ;ADD BRF TO LSW.
 (6)  014724  063712  003426                                                            ADD     BRFCNT,(
3675  014730                                      IF MSGPKT+MS.RFC LOS BRFCNT THEN  ;IF THE RFC IS LOWER OR THE SAME AS
 (6)  014730  023737  002344  003426                                                    CMP     MSGPKT+M
 (9)  014736  101002                                                                    BHI     50255$
3676  014740                                        LET (R2) := (R2) - MSGPKT+MS.RFC  ;SUBTRACT RFC FROM EXPECTED BRF.
 (6)  014740  163712  002344                                                            SUB     MSGPKT+M
3677  014744                                      ENDIF
 (4)  014744                                                                    50255$:
3678  014744                                      LET R3 := R2 + #10             ;R3 = ADR OF 2ND WORD.
 (4)  014744  010203                                                                    MOV     R2,R3
 (6)  014746  062703  000010                                                            ADD     #10,R3
3679  014752                                      WHILE (R2) GT #999. DO
 (4)  014752                                                                    50256$:
 (6)  014752  021227  001747                                                            CMP     (R2),#99
 (9)  014756  003404                                                                    BLE     50257$
3680  014760                                        LET (R2) := (R2) - #1000.    ;UPDATE BYTE COUNT
 (6)  014760  162712  001750                                                            SUB     #1000.,(
3681  014764                                        LET (R3) := (R3) + #1        ;2ND WORD.
 (6)  014764  005213                                                                    INC     (R3)
3682  014766                                      ENDDO
 (4)  014766  000771                                                                    BR      50256$
 (3)  014770                                                                    50257$:
3683  014770                                      LET R2 := R3 + #10             ;R2 = ADR OF 3RD WORD.
 (4)  014770  010302                                                                    MOV     R3,R2
 (6)  014772  062702  000010                                                            ADD     #10,R2
3684  014776                                      WHILE (R3) GT #999. DO
 (4)  014776                                                                    50260$:
 (6)  014776  021327  001747                                                            CMP     (R3),#99
 (9)  015002  003404                                                                    BLE     50261$
3685  015004                                        LET (R3) := (R3) - #1000.    ;UPDATE BYTE COUNT
 (6)  015004  162713  001750                                                            SUB     #1000.,(
3686  015010                                        LET (R2) := (R2) + #1        ;3RD WORD.
```

```
   (6)  015010  005212                                                                                    INC     (R2)
3687    015012                                                                                ENDDO
   (4)  015012  000771                                                                                    BR      50260$
   (3)  015014                                                                                        50261$:
3688    015014                                                                                LET R3 := R2 + #10          ;R3 = ADR OF 4TH WORD.
   (4)  015014  010203                                                                                    MOV     R2,R3
   (6)  015016  062703  000010                                                                            ADD     #10,R3
3689    015022                                                                                WHILE (R2) GT #999. DO
   (4)  015022                                                                                        50262$:
   (6)  015022  021227  001747                                                                            CMP     (R2),#99
   (9)  015026  003404                                                                                    BLE     50263$
3690    015030                                                                                  LET (R2) := (R2) - #1000.   ;UPDATE BYTE COUNT
   (6)  015030  162712  001750                                                                            SUB     #1000.,(
3691    015034                                                                                  LET (R3) := (R3) + #1       ;4TH WORD.
   (6)  015034  005213                                                                                    INC     (R3)
3692    015036                                                                                ENDDO
   (4)  015036  000771                                                                                    BR      50262$
   (3)  015040                                                                                        50263$:
3693    015040                                                                                IFB RWERR NE #0 THEN        ;IF R/W ERROR, UPDATE ERROR COUNT.
   (6)  015040  105737  003475                                                                            TSTB    RWERR
   (9)  015044  001440                                                                                    BEQ     50264$
3694    015046                                                                                  LET R2 := R5 + EINC(R4) + #WRREC  ;R2 = ADR OF COUNTER.
   (4)  015046  010502                                                                                    MOV     R5,R2
   (6)  015050  066402  015156                                                                            ADD     EINC(R4)
   (7)  015054  062702  002720                                                                            ADD     #WRREC,R
3695    015060                                                                                  IFB UNREC NE #0 THEN        ;IS THE ERROR UNRECOVERABLE?
   (6)  015060  105737  003476                                                                            TSTB    UNREC
   (9)  015064  001404                                                                                    BEQ     50265$
3696    015066                                                                                    LET R2 := R2 + #10        ;YES, POINT TO NEXT COUNTER.
   (6)  015066  062702  000010                                                                            ADD     #10,R2
3697    015072                                                                                    LET (R2) := (R2) + #1     ;UPDATE THE ERROR COUNTER
   (6)  015072  005212                                                                                    INC     (R2)
3698    015074                                                                                  ELSE                        ;ELSE - IF ERROR IS RECOVERABLE:
   (4)  015074  000424                                                                                    BR      50266$
   (3)  015076                                                                                        50265$:
3699    015076                                                                                    LET (R2) := (R2) + #1     ;UPDATE THE ERROR COUNTER
   (6)  015076  005212                                                                                    INC     (R2)
3700    015100                                                                                    IFB IREC EQ #0 THEN       ;IF ERROR RECOVERY IS ENABLED:
   (6)  015100  105737  002210                                                                            TSTB    IREC
   (9)  015104  001020                                                                                    BNE     50267$
3701    015106                                                                                      IFB DROPED EQ #0 ANDB ERCVER NE #0 THEN ;IF UNIT HAS NOT BEEN DR
   (6)  015106  105737  003530                                                                            TSTB    DROPED
   (9)  015112  001015                                                                                    BNE     50270$
   (6)  015114  105737  002207                                                                            TSTB    ERCVER
   (9)  015120  001412                                                                                    BEQ     50270$
3702    015122                                                                                        PRINTB #NURTY1,RETRYC     ;PRINT # OF RETRIES TO RECOVER
   (8)  015122  013746  003466                                                                            MOV     RETRYC,-
   (7)  015126  012746  005157                                                                            MOV     #NURTY1,
   (6)  015132  012746  000002                                                                            MOV     #2,-(SP)
   (3)  015136  010600                                                                                    MOV     SP,R0
   (4)  015140  104414                                                                                    TRAP    C$PNTB
   (4)  015142  062706  000006                                                                            ADD     #6,SP
3703    015146                                                                                      ENDIF                     ;PROVIDED PRINT HAS BEEN ENABLED
   (4)  015146                                                                                        50270$:
3704    015146                                                                                    ENDIF
   (4)  015146                                                                                        50267$:
```

```
3705  015146                                        ENDIF
 (4)  015146                                                                  50266$:
3706  015146                                      ENDIF
 (4)  015146                                                                  50264$:
3707  015146                                    ENDIF
 (4)  015146                                                                  50254$:
3708  015146                                    ENDIF
 (4)  015146                                                                  50253$:
3709  015146  000207                           RTS PC
3710                                    ;       INDEXES TO BYTE COUNTERS.
3711  015150  000000                   BINC:   0                               ;WRITE.
3712  015152  000040                           40                              ;READ REV.
3713  015154  000100                           100                             ;READ FWD.
3714                                    ;       INDEXES TO READ/WRITE ERROR COUNTERS.
3715  015156  000000                   EINC:   0                               ;WRITE.
3716  015160  000020                           20                              ;READ REV.
3717  015162  000040                           40                              ;READ FWD.
3718
3719
3720
```

```
                                        .SBTTL RAMER - READ AND DISPLAY SELECTED RAM
                                ;+
                                ;ROUTINE TO READ THE SELECTED RAM LOCATIONS
                                ;-
015164 010546                   RAMER:: MOV     R5,-(SP)
015166 010446                           MOV     R4,-(SP)
015170 010346                           MOV     R3,-(SP)
015172 010246                           MOV     R2,-(SP)
015174 010146                           MOV     R1,-(SP)
015176 012701 003346                    MOV     #RAMDATA,R1     ;ADDRESS TO SAVE THE RAM DATA
015202 013702 003342                    MOV     RAMHLD,R2       ;BYTE ADDRESS OF THE FIRST RAM DATA
015206 013703 003406                    MOV     RAMSIZ,R3       ;SET THE SIZE OF THE READ UP
015212 016504 002456                    MOV     TSDB(R5),R4     ;MOV THE TSDB ADDRESS INTO R4
015216 005204                           INC     R4              ;ADD 1 TO IT
015220 000240                   10$:    NOP
015222 004737 011516                    JSR     PC,WSSR         ;WAIT FOR THE SSR TO SET
015226 110214                           MOVB    R2,(R4)         ;SELECT NEXT RAM ADDRESS
015230 004737 011516                    JSR     PC,WSSR         ;WAIT FOR SSR TO SET
015234 117521 002456                    MOVB    @TSBA(R5),(R1)+ ;READ THE RAM DATA
015240 062702 000001            20$:    ADD     #1,R2           ;ADDRESS OF THE NEXT RAM LOCATION
015244 077313                           SOB     R3,10$          ;NUMBER OF LOCATIONS COUNTER
015246 013704 003406                    MOV     RAMSIZ,R4       ;GET THE RAM SIZE
015252 013702 003342                    MOV     RAMHLD,R2       ;GET THE STARTING RAM ADDRESS
015256 060204                           ADD     R2,R4           ;CALCULATE THE END ADDRESS
015260 162704 000001                    SUB     #1,R4           ;CORRECT VALUE OF PRINTOUT
015264                                  PRINTX  #RAMIOP,R2,R4   ;RAM ADDRESS = 10 - 17, ETC.
(9)  015264 010446                                                              MOV     R4,-(SP)
(8)  015266 010246                                                              MOV     R2,-(SP)
(7)  015270 012746 005401                                                       MOV     #RAMIOP,
(6)  015274 012746 000003                                                       MOV     #3,-(SP)
(3)  015300 010600                                                              MOV     SP,R0
(4)  015302 104415                                                              TRAP    C$PNTX
(4)  015304 062706 000010                                                       ADD     #10,SP
015310 012701 003346                    MOV     #RAMDATA,R1     ;ADDRESS OF WHERE RAM DATA IS
015314 013703 003406                    MOV     RAMSIZ,R3       ;THE SIZE OF THE RAM FIELD READ
015320 005004                   30$:    CLR     R4              ;NO EXTRA DATA LEFT OVER
015322 112104                           MOVB    (R1)+,R4        ;PICK UP BYTE OF RAM DATA
015324 042704 177400                    BIC     #177400,R4      ;GET RID OF SIGN EXTEND
015330                                  PRINTX  #RAMPD,R4       ;"010 211 111 222 377 000 123 134 ETC."
(8)  015330 010446                                                              MOV     R4,-(SP)
(7)  015332 012746 005452                                                       MOV     #RAMPD,-
(6)  015336 012746 000002                                                       MOV     #2,-(SP)
(3)  015342 010600                                                              MOV     SP,R0
(4)  015344 104415                                                              TRAP    C$PNTX
(4)  015346 062706 000006                                                       ADD     #6,SP
015352 077316                           SOB     R3,30$          ;LOOP UNTIL ALL PRINTED
015354 012601                           MOV     (SP)+,R1
015356 012602                           MOV     (SP)+,R2
015360 012603                           MOV     (SP)+,R3
015362 012604                           MOV     (SP)+,R4
015364 012605                           MOV     (SP)+,R5
015366 000207                   50$:    RTS     PC              ;RETURN
                                ;       IF A WRITE/VERIFY COMMAND IS ISSUED, CONTROL IS THEN
                                ;       TRANSFERRED TO THIS SUBROUTINE TO READ REVERSE, CHECK DATA,
                                ;       READ FORWARD, CHECK DATA, THEN CONTINUE TO NEXT COMMAND.
                                ;       INPUTS:
```

```
                                        ;       OUTPUTS:
                                        ;       REGISTERS:
                                        ;       CALLS:          VFEXC.
                                        ;
3765                                    ;
3766                                    ;
3767                                    ;
3768                                    ;
3769  015370                            VFYDAT::  LET CMPDAT := #0              ;BTL
 (4)  015370  005037  003410                                                    CLR     CMPDAT
3770  015374                                      LET STTIM  := #0              ;BTL
 (4)  015374  005037  003414                                                    CLR     STTIM
3771  015400                                      IFB VFYFLG NE #0 THEN         ;IF DATA IS TO BE VERIFIED:
 (6)  015400  105737  003524                                                    TSTB    VFYFLG
 (9)  015404  001436                                                            BEQ     50271$
3772  015406                                      LET PCMDWD := CMDWRD          ;SAVE THE PREVIOUS COMMAND WORD.
 (4)  015406  013737  003430  003434                                           MOV     CMDWRD,P
3773  015414                                      LET CMDWRD := #RDR            ;COMMAND IS READ REV.
 (4)  015414  012737  104401  003430                                           MOV     #RDR,CMD
3774  015422                                      LET CMDLG  := #4              ;SET UP CMD LOGGING INDEX.
 (4)  015422  012737  000004  003436                                           MOV     #4,CMDLG
3775  015430  004737  015504                      JSR   PC,VFEXC                ;GO READ ALL THE RECORDS REV.
3776  015434                                      IF DEVTBL(R5) NE #NINUSE THEN ;IF DRIVE HAS BEEN DROPPED EXIT
 (6)  015434  026527  002536  177774                                           CMP     DEVTBL(R
 (9)  015442  001417                                                            BEQ     50272$
3777  015444                                      LET CMPDAT := #0              ;BTL
 (4)  015444  005037  003410                                                    CLR     CMPDAT
3778  015450                                      LET STTIM  := #0              ;BTL
 (4)  015450  005037  003414                                                    CLR     STTIM
3779  015454                                      LET PCMDWD := CMDWRD          ;SAVE THE PREVIOUS COMMAND WORD.
 (4)  015454  013737  003430  003434                                           MOV     CMDWRD,P
3780  015462                                      LET CMDWRD := #RDF            ;COMMAND IS READ FWD.
 (4)  015462  012737  104001  003430                                           MOV     #RDF,CMD
3781  015470                                      LET CMDLG  := #6              ;SET UP CMD LOGGING INDEX.
 (4)  015470  012737  000006  003436                                           MOV     #6,CMDLG
3782  015476  004737  015504                      JSR   PC,VFEXC                ;GO READ ALL RECORDS FWD.
3783  015502                                      ENDIF
 (4)  015502                                                                                50272$:
3784  015502                                ENDIF
 (4)  015502                                                                                50271$:
3785  015502  000207                       RTS     PC                            ;RETURN.
```

```
3787                                    ;       SUBROUTINE TO EXECUTE THE READ AND VERIFY, FORWARD OR REVERSE.
3788                                    ;       INPUTS:
3789                                    ;       OUTPUTS:
3790                                    ;       REGISTERS:      R2
3791                                    ;       CALLS:          CMDAC, FIRSTU, VFISU, NEXTU, CKHAE.
3792
3793  015504                            VFEXC:: LET CMDPKT := CMDWRD CLR.BY #BRF.C  ;COMMAND PACKET = READ REV OR FWD.
 (4)  015504  013737  003430  002314                                                      MOV     CMDWRD,C
 (6)  015512  042737  004000  002314                                                      BIC     #BRF.C,C
3794  015520                                  IFB SWBFLG NE #0 THEN           ;IF BYTES ARE TO BE SWAPPED:
 (6)  015520  105737  003526                                                              TSTB    SWBFLG
 (9)  015524  001403                                                                      BEQ     50273$
3795  015526                                    LET CMDPKT := CMDPKT SET.BY #SWB.C  ;SET SWAB BIT IN CMD PACKET.
 (6)  015526  052737  010000  002314                                                      BIS     #SWB.C,C
3796  015534                                  ENDIF
 (4)  015534                                                                          50273$:
3797  015534                                  LET CMDSAV := CMDPKT            ;SAVE COMMAND PACKET 1ST WORD.
 (4)  015534  013737  002314  003432                                                      MOV     CMDPKT,C
3798  015542  013737  003420  002316          MOV     DATARD,CMDPKT+CP.ADL    ;SAVE BUFFER START ADDRESS.
3799  015550                                  LET NCNT := #0                  ;CLEAR NUMBER OF OPERATIONS.
 (4)  015550  005037  003422                                                              CLR     NCNT
3800  015554                                  WHILE NCNT LT NCNT1 DO          ;WHILE THERE ARE RECORDS REMAINING:
 (4)  015554                                                                          50274$:
 (6)  015554  023737  003422  003424                                                      CMP     NCNT,NCN
 (9)  015562  002101                                                                      BGE     50275$
3801  015564  004737  007614                    JSR PC,CMDAC                    ;STORE CMD ASCII IN ERROR MSG.
3802  015570  105737  003533                    TSTB  STREAM                    ;CHECK IF WE ARE STREAMING
3803  015574  001006                            BNE   1$                        ;BRANCH OVER DEVTBL CHECK. THIS ENABLES
3804                                                                    ;US TO TEST ONE DRIVE AT A TIME.
3805  015576  004737  016614                    JSR   PC,FIRSTU                 ;SET UP FOR FIRST UNIT.
3806  015602                                    WHILE DEVTBL(R5) NE #END DO     ;WHILE THERE ARE DEVICES REMAINING:
 (4)  015602                                                                          50276$:
 (6)  015602  026527  002536  177777                                                      CMP     DEVTBL(R
 (9)  015610  001445                                                                      BEQ     50277$
3807  015612                            1$:           IF #MOD.CO SETIN CMDWRD THEN  ;IF CMD IS REVERSE THEN:
 (6)  015612  032737  000400  003430                                                      BIT     #MOD.CO,
 (9)  015620  001421                                                                      BEQ     50300$
3808  015622                                      IF #X0.BOT NOTSETIN EOTFLG(R5) THEN  ;IF NOT AT BOT
 (6)  015622  032765  000002  003510                                                      BIT     #X0.BOT,
 (9)  015630  001014                                                                      BNE     50301$
3809  015632                                        IF #X0.EOT SETIN EOTFLG(R5) THEN   ;BUT IF AT EOT
 (6)  015632  032765  000001  003510                                                      BIT     #X0.EOT,
 (9)  015640  001406                                                                      BEQ     50302$
3810  015642                                          IFB ALLEOT NE #0 THEN           ;AND ALL OTHERS AT EOT
 (6)  015642  105737  003532                                                              TSTB    ALLEOT
 (9)  015646  001402                                                                      BEQ     50303$
3811  015650  004737  015770                            JSR PC,VFISU                ;THEN READ VERIFY
3812  015654                                          ENDIF                           ;IF NOT ALL AT EOT, FREEZE
 (4)  015654                                                                          50303$:
3813  015654                                        ELSE                            ;IF NOT AT BOT AND
 (4)  015654  000402                                                                      BR      50304$
 (3)  015656                                                                          50302$:
3814  015656  004737  015770                          JSR PC,VFISU                  ;NOT AT EOT, READ VFY
3815  015662                                        ENDIF
 (4)  015662                                                                          50304$:
3816  015662                                      ENDIF
```

```
 (4) 015662                                                                                    50301$:
3817 015662                                                  ELSE                          ;ELSE IF CMD IS NOT REVERSE:
 (4) 015662  000412                                                                            BR      50305$
 (3) 015664                                                                                    50300$:
3818 015664                                                    IF #X0.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
 (6) 015664  032765  000001  003510                                                           BIT     #X0.EOT,
 (8) 015672  001404                                                                           BEQ     50306$
 (6) 015674  032737  000001  003430                                                           BIT     #CMD.CO,
 (9) 015702  001002                                                                           BNE     50307$
 (6) 015704                                                                                    50306$:
3819                                                                                         ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
3820 015704  004737  015770                                    JSR PC,VFISU                    ;ISSUE CMD, CHECK STATUS AND DATA.
3821 015710                                                    ENDIF
 (4) 015710                                                                                    50307$:
3822 015710                                                  ENDIF
 (4) 015710                                                                                    50305$:
3823 015710  105737  003533                                   TSTB STREAM                   ;CHECK FOR TEST OF ON UNIT AT A TIME.
3824 015714  001003                                           BNE 2$                        ;BRANCH, IF STREAMING TESTS.
3825 015716  004737  016662                                   JSR PC,NEXTU                  ;GO FIND THE NEXT UNIT.
3826 015722                                                  ENDDO
 (4) 015722  000727                                                                            BR      50276$
 (3) 015724                                                                                    50277$:
3827 015724  004737  017222                        2$:       JSR   PC,CKHAE                ;CHECK FOR HALT AFTER EACH CMD.
3828 015730                                                  IF DEVTBL(R5) EQ #NINUSE THEN ;IF DRIVES BEEN DROPPED EXIT
 (6) 015730  026527  002536  177774                                                           CMP     DEVTBL(R
 (9) 015736  001005                                                                           BNE     50310$
3829 015740                                                    LET NCNT := NCNT1 - #1
 (4) 015740  013737  003424  003422                                                           MOV     NCNT1,NC
 (6) 015746  005337  003422                                                                   DEC     NCNT
3830 015752                                                    ENDIF
 (4) 015752                                                                                    50310$:
3831 015752                                                    LET NCNT := NCNT + #1         ;UPDATE THE RECORD COUNT.
 (6) 015752  005237  003422                                                                   INC     NCNT
3832 015756                                                    LET PCMDWD := CMDWRD          ;SAVE PREVIOUS COMMAND WORD.
 (4) 015756  013737  003430  003434                                                           MOV     CMDWRD,P
3833
3834 015764                                                  ENDDO
 (4) 015764  000673                                                                            BR      50274$
 (3) 015766                                                                                    50275$:
3835 015766  000207                                  RTS     PC                            ;RETURN.
```

```
3837                                    ;       SUBROUTINE TO ISSUE COMMAND, AWAIT INTERRUPT,
3838                                    ;       CHECK STATUS, CHECK DATA.
3839                                    ;       INPUTS:
3840                                    ;       OUTPUTS:
3841                                    ;       REGISTERS:      R2
3842                                    ;       CALLS:          EXCUTE, GOWAIT, CKDATA.
3843
3844  015770                            VFISU::
3845  015770                                LET R2 := DATARD + #8.      ;INIT READ BUFFER POINTER.
 (4)  015770  013702  003420                                                        MOV     DATARD,R
 (6)  015774  062702  000010                                                        ADD     #8.,R2
3846  016000                                WHILE R2 NE DATARD DO       ;UNTIL 8 BYTES HAVE BEEN SET,
 (4)  016000                                                                    50311$:
 (6)  016000  020237  003420                                                        CMP     R2,DATAR
 (9)  016004  001403                                                                BEQ     50312$
3847  016006                                LET -(R2) := #-1            ;INIT READ BUFFER.
 (4)  016006  012742  177777                                                        MOV     #-1,-(R2
3848  016012                                ENDDO
 (4)  016012  000772                                                                BR      50311$
 (3)  016014                                                                    50312$:
3849  016014  004737  010576               JSR PC,EXCUTE               ;GO EXECUTE THE COMMAND.
3850  016020                                IFB DROPED EQ #0 THEN       ;IF UNIT HAS NOT BEEN DROPPED THEN:
 (6)  016020  105737  003530                                                        TSTB    DROPED
 (9)  016024  001002                                                                BNE     50313$
3851  016026  004737  011166               JSR PC,GOWAIT       ;GO WAIT FOR DONE BIT.
3852  016032                                ENDIF
 (4)  016032                                                                    50313$:
3853  016032                                IFB DROPED EQ #0 THEN       ;IF UNIT HAS NOT BEEN DROPPED THEN:
 (6)  016032  105737  003530                                                        TSTB    DROPED
 (9)  016036  001057                                                                BNE     50314$
3854  016040                                  IF #X0.BOT NOTSETIN EOTFLG(R5) THEN      ;WHEN NOT REVERSED INTO BOT, THEN
 (6)  016040  032765  000002  003510                                                BIT     #X0.BOT,
 (9)  016046  001053                                                                BNE     50315$
3855  016050                                    IF L$TEST NE #3 THEN
 (6)  016050  023727  002114  000003                                                CMP     L$TEST,#
 (9)  016056  001403                                                                BEQ     50316$
3856  016060  004737  016200                     JSR   PC,CKDATA       ;GO VERIFY DATA.
3857  016064                                    ELSE
 (4)  016064  000444                                                                BR      50317$
 (3)  016066                                                                    50316$:
3858  016066                                      IF NCNT LT #3500. THEN
 (6)  016066  023727  003422  006654                                                CMP     NCNT,#35
 (9)  016074  002004                                                                BGE     50320$
3859  016076                                       LET DATRAT := #56.  ;1.7% DATA COMPARISONS
 (4)  016076  012737  000070  003412                                                MOV     #56.,DAT
3860  016104                                      ELSE
 (4)  016104  000411                                                                BR      50321$
 (3)  016106                                                                    50320$:
3861  016106                                       IF DATRAT NE #15. THEN
 (6)  016106  023727  003412  000017                                                CMP     DATRAT,#
 (9)  016114  001405                                                                BEQ     50322$
3862  016116                                       LET DATRAT := #15.  ;6.67% DATA COMPARISONS
 (4)  016116  012737  000017  003412                                                MOV     #15.,DAT
3863  016124                                       LET CMPDAT := #0
 (4)  016124  005037  003410                                                        CLR     CMPDAT
3864  016130                                       ENDIF
```

```
  (4)  016130                                                                                    50322$:
3865   016130                                                ENDIF
  (4)  016130                                                                                    50321$:
3866   016130  005237  003410                              INC   CMPDAT          ;ONE MORE XFER BEFORE A COMPARISON
3867   016134                                              IF CMPDAT EQ DATRAT THEN
  (6)  016134  023737  003410  003412                                                                CMP     CMPDAT,D
  (9)  016142  001015                                                                              BNE     50323$
3868   016144                                                IF STTIM NE #0 THEN ;BTL
  (6)  016144  005737  003414                                                                      TST     STTIM
  (9)  016150  001405                                                                              BEQ     50324$
3869   016152  004737  016200                                JSR PC,CKDATA
3870   016156                                                LET CMPDAT := #0
  (4)  016156  005037  003410                                                                      CLR     CMPDAT
3871   016162                                                ELSE
  (4)  016162  000405                                                                              BR      50325$
  (3)  016164                                                                                    50324$:
3872   016164                                                LET STTIM  := #1            ;BTL
  (4)  016164  012737  000001  003414                                                             MOV     #1,STTIM
3873   016172                                                LET CMPDAT := #0            ;BTL
  (4)  016172  005037  003410                                                                      CLR     CMPDAT
3874   016176                                                ENDIF                       ;BTL
  (4)  016176                                                                                    50325$:
3875   016176                                              ENDIF
  (4)  016176                                                                                    50323$:
3876   016176                                            ENDIF
  (4)  016176                                                                                    50317$:
3877   016176                                          ENDIF
  (4)  016176                                                                                    50315$:
3878   016176                                        ENDIF
  (4)  016176                                                                                    50314$:
3879   016176  000207                                RTS PC
3880
```

```
                                ;       SUBROUTINE TO COMPARE DATA BETWEEN READ AND WRITE BUFFERS
                                ;       AND PRINT ERROR MESSAGE ON MISCOMPARE.
                                ;       INPUTS:
                                ;       OUTPUTS:
                                ;       REGISTERS:      R2, R3, R4.
                                ;       CALLS:          GCMDA
                                
016200                          CKDATA:: LET R3 := BRFCNT - MSGPKT+MS.RFC ;COMPUTE REC LENGTH READ
 (4)  016200  013703  003426                                                    MOV     BRFCNT,R
 (6)  016204  163703  002344                                                    SUB     MSGPKT+M
016210                                  IF R3 EQ #0 THEN                ;WHEN NO DATA RECEIVED
 (6)  016210  005703                                                            TST     R3
 (9)  016212  001015                                                            BNE     50326$
016214                                    ERRHRD 17,WTVERM,DTAERM               ;PRINT ERROR AND EXIT
 (4)  016214  104456                                                            TRAP    C$ERHRD
 (5)  016216  000021                                                            .WORD   17
 (5)  016220  004250                                                            .WORD   WTVERM
 (5)  016222  005474                                                            .WORD   DTAERM
016224                                    PRINTB #DTAER4                ;COMPARE ROUTINE
 (7)  016224  012746  005074                                                    MOV     #DTAER4,
 (6)  016230  012746  000001                                                    MOV     #1,-(SP)
 (3)  016234  010600                                                            MOV     SP,R0
 (4)  016236  104414                                                            TRAP    C$PNTB
 (4)  016240  062706  000004                                                    ADD     #4,SP
016244                                  ELSE
 (4)  016244  000560                                                            BR      50327$
 (3)  016246                                                            50326$:
016246                                    IF R3 HI BRFCNT THEN          ;WHEN REC READ IS LONGER
 (6)  016246  020337  003426                                                    CMP     R3,BRFCN
 (9)  016252  101417                                                            BLOS    50330$
016254                                      ERRHRD 17,WTVERM,DTAERM             ;THAN EXPECTED, PRINT
 (4)  016254  104456                                                            TRAP    C$ERHRD
 (5)  016256  000021                                                            .WORD   17
 (5)  016260  004250                                                            .WORD   WTVERM
 (5)  016262  005474                                                            .WORD   DTAERM
016264                                      PRINTB #DTAER5,CMDPKT+CP.CNT        ;AN ERROR MESSAGE
 (8)  016264  013746  002322                                                    MOV     CMDPKT+C
 (7)  016270  012746  005115                                                    MOV     #DTAER5,
 (6)  016274  012746  000002                                                    MOV     #2,-(SP)
 (3)  016300  010600                                                            MOV     SP,R0
 (4)  016302  104414                                                            TRAP    C$PNTB
 (4)  016304  062706  000006                                                    ADD     #6,SP
016310                                    ELSE                          ;AND EXIT ROUTINE
 (4)  016310  000536                                                            BR      50331$
 (3)  016312                                                            50330$:
016312                                      LET CKDCNT := R3 - #1               ;SAVE VERIFICATION LENGTH - 1.
 (4)  016312  010337  016610                                                    MOV     R3,CKDCN
 (6)  016316  005337  016610                                                    DEC     CKDCNT
016322  005037  016612                    CLR CKDFF                     ;CLEAR # OF BYTES IN ERROR COUNTER.
016326  005002                            CLR R2                        ;INIT BYTE COUNTER
016330                                    LET R3 := DATAWT              ;GET WRITE BUFFER ADDRESS.
 (4)  016330  013703  003416                                                    MOV     DATAWT,R
016334                                    LET R4 := DATARD              ;GET READ BUFFER ADDRESS.
 (4)  016334  013704  003420                                                    MOV     DATARD,R
016340                                    IFB T1SWB NE #0 THEN          ;WHEN RUNNING TEST1-SUB 12,
 (6)  016340  105737  003531                                                    TSTB    T1SWB
```

```
  (9)  016344  001401                                                                  BEQ     50332$
3904   016346  000313                                    SWAB (R3)                  ;SWAP FIRST WORD OF WRT BFR
3905   016350                                            ENDIF                      ;WHICH CONTAINS THE RECORD COUNT
  (4)  016350                                                                        50332$:
3906   016350                                            REPEAT                     ;REPEAT UNTIL ALL DATA IS COMPARED:
  (3)  016350                                                                        50333$:
3907   016350                                              IF R2 EQ CKDCNT THEN     ;IF THIS IS THE LAST BYTE THEN:
  (6)  016350  020237  016610                                                        CMP     R2,CKDCN
  (9)  016354  001011                                                                BNE     50334$
3908   016356                                                IFB SWBFLG NE #0 THEN  ;IF BYTE SWAPPING IS ENABLED THEN:
  (6)  016356  105737  003526                                                        TSTB    SWBFLG
  (9)  016362  001406                                                                BEQ     50335$
3909   016364                                                  IF #BIT00 NOTSETIN CKDCNT THEN      ;IF RECORD LENGTH IS ODD
  (6)  016364  032737  000001  016610                                               BIT     #BIT00,C
  (9)  016372  001002                                                                BNE     50336$
3910   016374  105723                                            TSTB        (R3)+          ;LAST BYTE WILL BE IN
3911   016376  105724                                            TSTB        (R4)+          ;THE UPPER BYTE.
3912   016400                                                  ENDIF
  (4)  016400                                                                        50336$:
3913   016400                                                ENDIF
  (4)  016400                                                                        50335$:
3914   016400                                              ENDIF
  (4)  016400                                                                        50334$:
3915   016400  121314                                      CMPB (R3),(R4)           ;ARE THEY EQUAL.
3916   016402  001452                                      BEQ     3$                   ;BR IF SO.
3917   016404  005737  016612                              TST CKDFF                ;1 ST TIME THRU?
3918   016410  001010                                      BNE     2$                   ;BR IF NOT.
3919   016412  005265  003300                              INC     VFYCNT(R5)           ;INC THE VERIFY ERROR COUNTER.
3920   016416  005265  003310                              INC HRDCNT(R5)           ;INC THE HARD ERROR COUNT.
3921   016422                                              ERRHRD 17,WTVERM,DTAERM  ;REPORT WRITE/VERIFY ERROR.
  (4)  016422  104456                                                                TRAP    C$ERHRD
  (5)  016424  000021                                                                .WORD   17
  (5)  016426  004250                                                                .WORD   WTVERM
  (5)  016430  005474                                                                .WORD   DTAERM
3922   016432                                  2$:         LET CKDFF := CKDFF + #1   ;INCREMENT # OF BYTES IN ERROR.
  (6)  016432  005237  016612                                                        INC     CKDFF
3923   016436  111437  003446                              MOVB (R4),TIME1          ;SAVE WAS DATA FOR TYPOUT.
3924   016442  042737  177400  003446                      BIC     #177400,TIME1        ;CLEAR GARBAGE.
3925   016450  111337  003450                              MOVB (R3),TIME2          ;SAVE SHOULD BE DATA FOR TYPOUT.
3926   016454  042737  177400  003450                      BIC     #177400,TIME2        ;CLEAR GARBAGE.
3927   016462                                              IF CKDFF LT #11. THEN    ;IF ERROR BYTE COUNT IS LESS THAN 11:
  (6)  016462  023727  016612  000013                                               CMP     CKDFF,#1
  (9)  016470  002017                                                                BGE     50337$
3928   016472                                                PRINTX #DTAER2,R2,<B,TIME1>,<B,TIME2>  ;PRINT EXP + ACT DATA.
 (10)  016472  005046                                                                CLR     -(SP)
 (10)  016474  153716  003450                                                        BISB    TIME2,(S
  (9)  016500  005046                                                                CLR     -(SP)
  (9)  016502  153716  003446                                                        BISB    TIME1,(S
  (8)  016506  010246                                                                MOV     R2,-(SP)
  (7)  016510  012746  004763                                                        MOV     #DTAER2,
  (6)  016514  012746  000004                                                        MOV     #4,-(SP)
  (3)  016520  010600                                                                MOV     SP,R0
  (4)  016522  104415                                                                TRAP    C$PNTX
  (4)  016524  062706  000012                                                        ADD     #12,SP
3929   016530                                              ENDIF
  (4)  016530                                                                        50337$:
```

```
3930  016530  105723                  3$:     TSTB (R3)+                      ;UPDATE WRITE BUFFER ADDRESS.
3931  016532  105724                          TSTB (R4)+                      ;UPDATE READ BUFFER ADDRESS.
3932  016534  105722                          TSTB (R2)+                      ;UPDATE BYTE COUNTER.
3933  016536                                UNTIL R2 GT CKDCNT          ;END OF DATA COMPARE REPEAT LOOP.
 (3)  016536  020237  016610                                                      CMP     R2,CKDCN
 (6)  016542  003702                                                              BLE     50333$
3934  016544                                LET CKDCNT := CKDCNT + #1   ;CKDCNT EQUALS RECORD LENGTH.
 (6)  016544  005237  016610                                                      INC     CKDCNT
3935  016550                                IF CKDFF NE #0 THEN         ;IF COMPARE ERROR HAS OCCURED THEN:
 (6)  016550  005737  016612                                                      TST     CKDFF
 (9)  016554  001414                                                              BEQ     50340$
3936  016556                                  PRINTB #DTAER3,CKDFF,CKDCNT         ;PRINT # OF BYTES IN ERROR.
 (9)  016556  013746  016610                                                      MOV     CKDCNT,-
 (8)  016562  013746  016612                                                      MOV     CKDFF,-(
 (7)  016566  012746  005032                                                      MOV     #DTAER3,
 (6)  016572  012746  000003                                                      MOV     #3,-(SP)
 (3)  016576  010600                                                              MOV     SP,R0
 (4)  016600  104414                                                              TRAP    C$PNTB
 (4)  016602  062706  000010                                                      ADD     #10,SP
3937  016606                                  ENDIF
 (4)  016606                                                                  50340$:
3938  016606                                ENDIF
 (4)  016606                                                                  50331$:
3939  016606                              ENDIF
 (4)  016606                                                                  50327$:
3940  016606  000207                      RTS     PC                     ;OTHERWISE, RETURN.
3941
3942  016610  000000              CKDCNT: .WORD   0                      ;# OF BYTES TO BE VERIFIED -1.
3943  016612  000000              CKDFF:  .WORD   0                      ;# OF BYTES IN ERROR COUNTER.
```

```
3945                                    ;       SUBROUTINE TO FIND THE FIRST DEVICE IN THE TEST SEQUENCE.
3946                                    ;       INPUTS:
3947                                    ;       OUTPUTS:
3948                                    ;       REGISTERS:
3949                                    ;       CALLS:
3950
3951  016614                            FIRSTU::LET DROPED :B= #0               ;CLR UNIT DROPPED FLAG
 (4)  016614  105037  003530                                                            CLRB    DROPED
3952  016620                                    LET R5 := #0                    ;CLR DEVICE POINTER.
 (4)  016620  005005                                                                    CLR     R5
3953  016622                                    WHILE DEVTBL(R5) EQ #NINUSE DO  ;WHILE DEVICES ARE NOT IN USE:
 (4)  016622                                                                    50341$:
 (6)  016622  026527  002536  177774                                                    CMP     DEVTBL(R
 (9)  016630  001003                                                                    BNE     50342$
3954  016632                                      LET R5 := R5 + #2             ;POINT TO NEXT DEVICE.
 (6)  016632  062705  000002                                                            ADD     #2,R5
3955  016636                                    ENDDO
 (4)  016636  000771                                                                    BR      50341$
 (3)  016640                                                                    50342$:
3956  016640                                    IF DEVTBL(R5) EQ #END THEN      ;IF ALL UNITS HAVE BEEN DROPPED THEN:
 (6)  016640  026527  002536  177777                                                    CMP     DEVTBL(R
 (9)  016646  001001                                                                    BNE     50343$
3957  016650                                      DOCLN                           ;DO CLEAN CODE AND TERMINATE PASS.
 (3)  016650  104444                                                                    TRAP    C$DCLN
3958  016652                                    ENDIF
 (4)  016652                                                                    50343$:
3959  016652                                    LET L$LUN := DEVTBL(R5)         ;SET UNIT # IN 'HEADER' FOR ERROR REPORT
 (4)  016652  016537  002536  002074                                                    MOV     DEVTBL(R
3960  016660  000207                           RTS     PC                      ;RETURN WITH 1ST DEVICE IN R5.
3961
3962
3963
3964
3965
3966                                    ;       SUBROUTINE TO FIND THE NEXT UNIT IN THE TEST CYCLE.
3967                                    ;       INPUTS:
3968                                    ;       OUTPUTS:
3969                                    ;       REGISTERS:
3970                                    ;       CALLS:
3971
3972  016662                            NEXTU:: LET DROPED :B= #0               ;CLR UNIT DROPPED FLAG
 (4)  016662  105037  003530                                                            CLRB    DROPED
3973  016666  042705  177770                   BIC     #177770,R5
3974  016672                                    REPEAT                          ;REPEAT UNTIL THE NEXT DEVICE IS FOUND.
 (3)  016672                                                                    50344$:
3975  016672                                      LET R5 := R5 + #2             ;UPDATE DEVICE TABLE POINTER.
 (6)  016672  062705  000002                                                            ADD     #2,R5
3976  016676                                    UNTIL DEVTBL(R5) NE #NINUSE
 (3)  016676  026527  002536  177774                                                    CMP     DEVTBL(R
 (6)  016704  001772                                                                    BEQ     50344$
3977  016706                                    LET L$LUN := DEVTBL(R5)         ;SET UNIT # IN 'HEADER' FOR ERROR REPORT
 (4)  016706  016537  002536  002074                                                    MOV     DEVTBL(R
3978  016714  000207                           RTS     PC                      ;RETURN.
3979
3980
3981
```

```
                        ;       SUBROUTINE TO DROP A DEVICE FROM THE TEST SEQUENCE.
                        ;       INPUTS:
                        ;       OUTPUTS:
                        ;       REGISTERS:
                        ;       CALLS:          MOVMSG, PRXST, LOG
                        ;
                        DROPU:: LET R5SAVE := R5
016716 010537 003462                                                    MOV     R5,R5SAV
                                LET FTLCNT(R5) := FTLCNT(R5) + #1  ;INCREMENT THE FATAL ERROR COUNT.
016722 005265 003320                                                    INC     FTLCNT(R
                                LET R4 := MSGPKT+MS.XS3 CLR.BY #377 ;GET UDIAG ERROR CODE FROM XSTAT3.
016726 013704 002354                                                    MOV     MSGPKT+M
016732 042704 000377                                                    BIC     #377,R4
                                LET R3 := MSGPKA(R5)            ;ADR OF THIS UNIT'S MSG PACKET.
016736 016503 002506                                                    MOV     MSGPKA(R
                                LET R2 := #0                    ;CLR COUNTER.
016742 005002                                                           CLR     R2
                                WHILE R2 NE #MSGCNT DO          ;WHILE THERE ARE MORE LOCATIONS:
016744                                                          50345$:
016744 020227 000016                                                    CMP     R2,#MSGC
016750 001405                                                           BEQ     50346$
                                  LET (R3)+ := #-1              ;INIT THE MSG PACKET WITH ALL 1'S
016752 012723 177777                                                    MOV     #-1,(R3)
                                  LET R2 := R2 + #2             ;UPDATE COUNTER.
016756 062702 000002                                                    ADD     #2,R2
                                ENDDO
016762 000770                                                           BR      50345$
016764                                                          50346$:
                                LET @TSDB(R5) := #GSCPK         ;INITIATE A GET STATUS COMMAND.
016764 012775 002324 002456                                             MOV     #GSCPK,@
                                JSR PC,WSSR                     ;WAIT A WHILE FOR SSR=1
016772 004737 011516
                                JSR PC,MOVMSG                   ;MOVE MSG PACKET TO COMMON AREA.
016776 004737 011552
                                IF R4 EQ #X3.RNY THEN           ;IF WE HAVE A CAPSTAN RUNAWAY THEN:
017002 020427 157400                                                    CMP     R4,#X3.R
017006 001005                                                           BNE     50347$
                                  ERRDF 16,RNYM,STAERM            ;REPORT CAPSTAN RUNAWAY WITH TACH CNT.
017010 104455                                                           TRAP    C$ERDF
017012 000020                                                           .WORD   16
017014 004570                                                           .WORD   RNYM
017016 005642                                                           .WORD   STAERM
                                ELSE                            ;ELSE-IF NOT A RUNNAWAY:
017020 000402                                                           BR      50350$
017022                                                          50347$:
                                  JSR PC,PRXST                  ;PRINT EXTENDED STATUS REGISTERS.
017022 004737 017140
                                ENDIF
017026                                                          50350$:
                                IFB RECLOG NE #0 THEN           ;IF THE RECORD HAS BEEN LOGGED THEN:
017026 105737 003473                                                    TSTB    RECLOG
017032 001404                                                           BEQ     50351$
                                  LET DROPED :B= DROPED + #1    ;SET UNIT DROPPED FLAG.
017034 105237 003530                                                    INCB    DROPED
                                  JSR PC,LOG                    ;LOG DATA BYTES + RD/WR ERRORS.
017040 004737 014664
                                ENDIF
017044                                                          50351$:
                                DORPT                           ;PRINT PERFORMANCE REPORT
017044 104424                                                           TRAP    C$DRPT
```

```
 4011  017046                          DROPUA: IF PASCNT(R5) NE #0 THEN
  (6)  017046  005765  003260                                                  TST     PASCNT(R
  (9)  017052  001402                                                          BEQ     50352$
 4012  017054                                    LET PASCNT(R5) := PASCNT(R5) - #1
  (6)  017054  005365  003260                                                  DEC     PASCNT(R
 4013  017060                                  ENDIF
  (4)  017060                                                          50352$:
 4014  017060                                  LET DROPN := DEVTBL(R5)         ;SAVE # OF UNIT TO BE DROPPED.
  (4)  017060  016537  002536  017136                                          MOV     DEVTBL(R
 4015  017066                                  LET R0 := R5 SHIFT -1           ;R0=LOGICAL DEVICE NUMBER
  (4)  017066  010500                                                          MOV     R5,R0
  (7)  017070  006200                                                          ASR     R0
 4016  017072                                  DODU R0                 ;DROP THE UNIT: EXEC BGNDU-ENDDU CODE IF IDU = 0
  (3)  017072  104451                                                          TRAP    C$DODU
 4017  017074                                  IF DEVTBL(R5) NE #NINUSE THEN   ;IF UNIT NOT DROPPED
  (6)  017074  026527  002536  177774                                          CMP     DEVTBL(R
  (9)  017102  001410                                                          BEQ     50353$
 4018  017104                                    IFB IREC EQ #0 THEN             ;IF RECOVERY IS ENABLED THEN:
  (6)  017104  105737  002210                                                  TSTB    IREC
  (9)  017110  001005                                                          BNE     50354$
 4019  017112  000240                              NOP
 4020  017114  000240                              NOP
 4021  017116  000240                              NOP
 4022  017120                                      LET STAFLG :B= STAFLG + #1       ;SET START FLAG TO ENABLE REWIND.
  (6)  017120  105237  003536                                                  INCB    STAFLG
 4023  017124                                    ENDIF
  (4)  017124                                                          50354$:
 4024  017124                                  ENDIF
  (4)  017124                                                          50353$:
 4025  017124                          DRORTN: LET DROPED :B= DROPED + #1       ;SET UNIT DROPPED FLAG.
  (6)  017124  105237  003530                                                  INCB    DROPED
 4026  017130                                  LET R5 := R5SAVE
  (4)  017130  013705  003462                                                  MOV     R5SAVE,R
 4027  017134  000207                          RTS     PC                      ;RETURN.
 4028
 4029  017136  000000                          DROPN:  .WORD   0               ;# OF UNIT TO BE DROPPED
```

```
 4031                                   ;       SUBROUTINE TO PRINT EXTENDED STATUS REGISTERS.
 4032                                   ;       INPUTS:
 4033                                   ;       OUTPUTS:
 4034                                   ;       REGISTERS:
 4035                                   ;       CALLS:
 4036
 4037  017140                           PRXST:: PRINTX #GETSTM
  (7)  017140  012746  005243                                                    MOV     #GETSTM,
  (6)  017144  012746  000001                                                    MOV     #1,-(SP)
  (3)  017150  010600                                                            MOV     SP,R0
  (4)  017152  104415                                                            TRAP    C$PNTX
  (4)  017154  062706  000004                                                    ADD     #4,SP
 4038  017160                                   PRINTX  #STAER5,MSGPKT+MS.XS0,MSGPKT+MS.XS1,MSGPKT+MS.XS2,MSGPKT+MS.XS3
  (11) 017160  013746  002354                                                    MOV     MSGPKT+M
  (10) 017164  013746  002352                                                    MOV     MSGPKT+M
  (9)  017170  013746  002350                                                    MOV     MSGPKT+M
  (8)  017174  013746  002346                                                    MOV     MSGPKT+M
  (7)  017200  012746  006467                                                    MOV     #STAER5,
  (6)  017204  012746  000005                                                    MOV     #5,-(SP)
  (3)  017210  010600                                                            MOV     SP,R0
  (4)  017212  104415                                                            TRAP    C$PNTX
  (4)  017214  062706  000014                                                    ADD     #14,SP
 4039  017220  000207                                   RTS PC
 4040
 4041
 4042
 4043
 4044                                   ;       SUBROUTINE TO HALT AFTER EACH COMMAND.
 4045                                   ;       INPUTS:
 4046                                   ;       OUTPUTS:
 4047                                   ;       REGISTERS:      R3, R4
 4048                                   ;       CALLS:
 4049
 4050  017222                           CKHAE:: IFB HAE NE #0 THEN              ;IF HALT FLAG IS SET:
  (6)  017222  105737  002206                                                    TSTB    HAE
  (9)  017226  001430                                                            BEQ     50355$
 4051  017230                                     IFB MISCFG EQ #0 THEN         ;
  (6)  017230  105737  003541                                                    TSTB    MISCFG
  (9)  017234  001023                                                            BNE     50356$
 4052  017236                                       MANUAL                      ;IS MANUAL INTERVENTION ALLOWED?
  (3)  017236  104450                                                            TRAP    C$MANI
 4053  017240                                       BNCOMPLETE CKHRTN           ;BR IF NOT.
  (2)  017240  103023                                                            BCC     CKHRTN
 4054  017242                                       LET R4 := CMDWRD            ;COMMAND WORD.
  (4)  017242  013704  003430                                                    MOV     CMDWRD,R
 4055  017246  004737  007670                       JSR PC,GCMDA                ;FETCH ADR OF CMD ASCII.
 4056  017252                                       LET HALTM :B= (R3)+         ;MOVE CMD ASCII
  (4)  017252  112337  004126                                                    MOVB    (R3)+,HA
 4057  017256                                       LET HALTM+1 :B= (R3)+
  (4)  017256  112337  004127                                                    MOVB    (R3)+,HA
 4058  017262                                       LET HALTM+2 :B= (R3)                ;INTO MESSAGE.
  (4)  017262  111337  004130                                                    MOVB    (R3),HAL
 4059  017266                                       GMANIL HALTM,TIME1,1,YES    ;HALT - WAIT FOR AN OEPRATOR INPUT.
  (3)  017266  104443                                                            TRAP    C$GMAN
  (3)  017270  000404                                                            BR      10000$
  (4)  017272  003446                                                            .WORD   TIME1
```

```
                                                                                .WORD   T$CODE
                                                                                .WORD   HALTM
                                                                                .WORD   1
                                        10000$:
                                                ELSE
                                                                                BR      50357$
                                                                        50356$:
                                                  LET MISCFG :B= #0     ;
                                                                                CLRB    MISCFG
                                                ENDIF
                                                                        50357$:
                                              ENDIF
                                                                        50355$:
                                        CKHRTN: RTS     PC              ;RETURN
```

```
 4066                                   ;       SUBROUTINE TO CREATE THE SEQUENCE FOR A WRITE TAPE MARK
 4067                                   ;       COMMAND.  WILL EXECUTE COMMAND TO UUT.
 4068                                   ;       INPUTS:
 4069                                   ;       OUTPUTS: CMDSEQ
 4070                                   ;       CALLS:  SETUP, CMDAC, EXCUTE, GOWAIT
 4071
 4072  017312                           WRITEM::
 4073  017312                                   LET R1 := #CMDSEQ
  (4)  017312  012701  003544                                                      MOV     #CMDSEQ,
 4074  017316                                   LET (R1)+ := #WTM       ;COMMAND
  (4)  017316  012721  100011                                                      MOV     #WTM,(R1
 4075  017322                                   LET (R1)+ := #1         ;BRF
  (4)  017322  012721  000001                                                      MOV     #1,(R1)+
 4076  017326                                   LET (R1)+ := #1         ;ITERATIONS
  (4)  017326  012721  000001                                                      MOV     #1,(R1)+
 4077  017332  005721                           TST (R1)+               ;PATTERN
 4078  017334                                   LET (R1)+ := #END       ;TERMINATOR
  (4)  017334  012721  177777                                                      MOV     #END,(R1
 4079  017340                                   LET R1 := #CMDSEQ       ;TOP OF BUFFER
  (4)  017340  012701  003544                                                      MOV     #CMDSEQ,
 4080  017344  004737  007722                   JSR PC, SETUP           ;SET UP THE TABLE
 4081  017350  004737  007614                   JSR PC, CMDAC           ;LOAD THE ASCII
 4082  017354  004737  010576                   JSR PC, EXCUTE          ;ISSUE THE WTM COMMAND
 4083  017360  004737  011166                   JSR PC, GOWAIT          ;WAIT FOR THE COMMAND TO FINISH
 4084  017364  000207                           RTS PC                  ;RETURN TO CALLER
 4085                                           .EVEN
 4086
 4087  017366                                   ENDMOD
```

```
 4099
 4100                                   .TITLE MISCELLANEOUS SECTIONS
 4101                                   .SBTTL  REPORT CODING SECTION
 4110
 4111  017366                           BGNMOD
 4112
 4113                                   ;++
 4114                                   ; THE REPORT CODING SECTION CONTAINS THE
 4115                                   ; 'PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
 4116                                   ;--
 4117
 4118  017366                           BGNRPT
  (3)  017366                           L$RPT::
 4119
 4125  017366                           LET     R5SAVE := R5            ;SAVE CURRENT DEVICE POINTER.
  (4)  017366  010537  003462                                                            MOV     R5,R5SAV
 4126  017372  004737  016614           JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
 4127  017376                           WHILE DEVTBL(R5) NE #END DO     ;WHILE THERE ARE MORE DEVICES:
  (4)  017376                                                                            50360$:
  (6)  017376  026527  002536  177777                                                    CMP     DEVTBL(R
  (9)  017404  001562                                                                    BEQ     50361$
 4128  017406                             PRINTS        #RPT1A,DEVTBL(R5),PASCNT(R5),RECCNT(R5)
  (10) 017406  016546  003330                                                            MOV     RECCNT(R
  (9)  017412  016546  003260                                                            MOV     PASCNT(R
  (8)  017416  016546  002536                                                            MOV     DEVTBL(R
  (7)  017422  012746  020230                                                            MOV     #RPT1A,-
  (6)  017426  012746  000004                                                            MOV     #4,-(SP)
  (3)  017432  010600                                                                    MOV     SP,R0
  (4)  017434  104416                                                                    TRAP    C$PNTS
  (4)  017436  062706  000012                                                            ADD     #12,SP
 4129  017442                             PRINTS        #RPT1B,WRBC+30(R5),WRBC+20(R5),WRBC+10(R5),WRBC(R5)
  (11) 017442  016546  002560                                                            MOV     WRBC(R5)
  (10) 017446  016546  002570                                                            MOV     WRBC+10(
  (9)  017452  016546  002600                                                            MOV     WRBC+20(
  (8)  017456  016546  002610                                                            MOV     WRBC+30(
  (7)  017462  012746  020305                                                            MOV     #RPT1B,-
  (6)  017466  012746  000005                                                            MOV     #5,-(SP)
  (3)  017472  010600                                                                    MOV     SP,R0
  (4)  017474  104416                                                                    TRAP    C$PNTS
  (4)  017476  062706  000014                                                            ADD     #14,SP
 4130  017502                             PRINTS        #RPT1C,RRBC+30(R5),RRBC+20(R5),RRBC+10(R5),RRBC(R5)
  (11) 017502  016546  002620                                                            MOV     RRBC(R5)
  (10) 017506  016546  002630                                                            MOV     RRBC+10(
  (9)  017512  016546  002640                                                            MOV     RRBC+20(
  (8)  017516  016546  002650                                                            MOV     RRBC+30(
  (7)  017522  012746  020356                                                            MOV     #RPT1C,-
  (6)  017526  012746  000005                                                            MOV     #5,-(SP)
  (3)  017532  010600                                                                    MOV     SP,R0
  (4)  017534  104416                                                                    TRAP    C$PNTS
  (4)  017536  062706  000014                                                            ADD     #14,SP
 4131  017542                             PRINTS        #RPT1D,RFBC+30(R5),RFBC+20(R5),RFBC+10(R5),RFBC(R5)
  (11) 017542  016546  002660                                                            MOV     RFBC(R5)
  (10) 017546  016546  002670                                                            MOV     RFBC+10(
  (9)  017552  016546  002700                                                            MOV     RFBC+20(
  (8)  017556  016546  002710                                                            MOV     RFBC+30(
  (7)  017562  012746  020427                                                            MOV     #RPT1D,-
```

```
   (6)  017566  012746  000005                                                                MOV     #5,-(SP)
   (3)  017572  010600                                                                        MOV     SP,R0
   (4)  017574  104416                                                                        TRAP    C$PNTS
   (4)  017576  062706  000014                                                                ADD     #14,SP
 4132   017602                        PRINTS      #RPT1F,WRREC(R5),RRREC(R5),RFREC(R5)
  (10)  017602  016546  002760                                                                MOV     RFREC(R5
  (9)   017606  016546  002740                                                                MOV     RRREC(R5
  (8)   017612  016546  002720                                                                MOV     WRREC(R5
  (7)   017616  012746  020533                                                                MOV     #RPT1F,-
  (6)   017622  012746  000004                                                                MOV     #4,-(SP)
  (3)   017626  010600                                                                        MOV     SP,R0
  (4)   017630  104416                                                                        TRAP    C$PNTS
  (4)   017632  062706  000012                                                                ADD     #12,SP
 4133   017636                        PRINTS      #RPT1G,WRUNR(R5),RRUNR(R5),RFUNR(R5)
  (10)  017636  016546  002770                                                                MOV     RFUNR(R5
  (9)   017642  016546  002750                                                                MOV     RRUNR(R5
  (8)   017646  016546  002730                                                                MOV     WRUNR(R5
  (7)   017652  012746  020604                                                                MOV     #RPT1G,-
  (6)   017656  012746  000004                                                                MOV     #4,-(SP)
  (3)   017662  010600                                                                        MOV     SP,R0
  (4)   017664  104416                                                                        TRAP    C$PNTS
  (4)   017666  062706  000012                                                                ADD     #12,SP
 4134   017672                        IFB BADTSW NE #0 THEN       ;
  (6)   017672  105737  002211                                                                TSTB    BADTSW
  (9)   017676  001402                                                                        BEQ     50362$
 4135   017700  004737  017762          JSR PC,BTRPT        ;GO PRINT BAD TAPE SPOTS WHEN  ENABLED
 4136   017704                        ENDIF
  (4)   017704                                                                    50362$:
 4137   017704                        PRINTS      #RPT1I,SCCNT(R5),HRDCNT(R5),FTLCNT(R5),VFYCNT(R5)
  (11)  017704  016546  003300                                                                MOV     VFYCNT(R
  (10)  017710  016546  003320                                                                MOV     FTLCNT(R
  (9)   017714  016546  003310                                                                MOV     HRDCNT(R
  (8)   017720  016546  003270                                                                MOV     SCCNT(R5
  (7)   017724  012746  021001                                                                MOV     #RPT1I,-
  (6)   017730  012746  000005                                                                MOV     #5,-(SP)
  (3)   017734  010600                                                                        MOV     SP,R0
  (4)   017736  104416                                                                        TRAP    C$PNTS
  (4)   017740  062706  000014                                                                ADD     #14,SP
 4138   017744  004737  016662          JSR   PC,NEXTU              ;FIND THE NEXT UNIT.
 4139   017750                        ENDDO
  (4)   017750  000612                                                                        BR      50360$
  (3)   017752                                                                    50361$:
 4140   017752                        LET R5 := R5SAVE            ;RESTORE CURRENT DEVICE POINTER.
  (4)   017752  013705  003462                                                                MOV     R5SAVE,R
 4141   017756                        EXIT    RPT
  (4)   017756  000167                                                                        .WORD   J$JMP
  (3)   017760  001230                                                                        .WORD   L10010-2
 4142
 4143                                ;       SUBR TO PRINT BAD TAPES SPOTS DURING THE REPORT PRINTS
 4144                                ;       WRITE RETRIES: CUMULATIVE COUNT
 4145                                ;       BAD TAPE SPOTS: COUNT PER TAPE PASS ONLY, NOT CUMULATIVE.
 4146                                ;       COUNT OF RECOVERABLE WRITE ERRORS EXCLUDES BAD TAPE SPOTS.
 4147
 4148   017762                       BTRPT:  PRINTS  #RPT1E,WRTYCT(R5)       ;PRINT GLOBAL WRITE RETRY COUNT
  (8)   017762  016546  003250                                                                MOV     WRTYCT(R
  (7)   017766  012746  020655                                                                MOV     #RPT1E,-
```

```
   (6)  017772  012746  000002                                                                  MOV     #2,-(SP)
   (3)  017776  010600                                                                          MOV     SP,R0
   (4)  020000  104416                                                                          TRAP    C$PNTS
   (4)  020002  062706  000006                                                                  ADD     #6,SP
 4149   020006                        LET BTPT := BTADDR(R5)  ;BTPT IS BOTH THE BAD TAPE SPOT COUNTER
   (4)  020006  016537  002550  003520                                                         MOV     BTADDR(R
 4150   020014                        LET R3 := @BTPT SHIFT -1        ;AND THE LOGGING INDEX
   (4)  020014  017703  163500                                                                  MOV     @BTPT,R3
   (7)  020020  006203                                                                          ASR     R3
 4151   020022                        PRINTS  #RPT1J,R3       ;PRINT # OF BAD TAPE SPOTS
   (8)  020022  010346                                                                          MOV     R3,-(SP)
   (7)  020024  012746  020705                                                                  MOV     #RPT1J,-
   (6)  020030  012746  000002                                                                  MOV     #2,-(SP)
   (3)  020034  010600                                                                          MOV     SP,R0
   (4)  020036  104416                                                                          TRAP    C$PNTS
   (4)  020040  062706  000006                                                                  ADD     #6,SP
 4152   020044                        IF R3 NE #0 THEN                ;PRINT RECORD # IF BAD SPOTS DETECTED
   (6)  020044  005703                                                                          TST     R3
   (9)  020046  001457                                                                          BEQ     50363$
 4153   020050                          IF R3 HI #20. THEN            ;
   (6)  020050  020327  000024                                                                  CMP     R3,#20.
   (9)  020054  101402                                                                          BLOS    50364$
 4154   020056                            LET R3 := #20.              ;20 BAD SPOTS IS THE LIMIT
   (4)  020056  012703  000024                                                                  MOV     #20.,R3
 4155   020062                          ENDIF
   (4)  020062                                                                        50364$:
 4156   020062                          PRINTS        #CRLFSP         ;
   (7)  020062  012746  005302                                                                  MOV     #CRLFSP,
   (6)  020066  012746  000001                                                                  MOV     #1,-(SP)
   (3)  020072  010600                                                                          MOV     SP,R0
   (4)  020074  104416                                                                          TRAP    C$PNTS
   (4)  020076  062706  000004                                                                  ADD     #4,SP
 4157   020102                          LET R4 := BTPT + #2   ;FETCH A BAD SPOT ID
   (4)  020102  013704  003520                                                                  MOV     BTPT,R4
   (6)  020106  062704  000002                                                                  ADD     #2,R4
 4158   020112                          LET R2 := #0          ;R2 = PRINT COUNT PER LINE: 10 MAX
   (4)  020112  005002                                                                          CLR     R2
 4159   020114                          REPEAT                        ;
   (3)  020114                                                                        50365$:
 4160   020114                            PRINTS      #RPT1K,(R4)     ;PRINT A BAD SPOT ID
   (8)  020114  011446                                                                          MOV     (R4),-(S
   (7)  020116  012746  020772                                                                  MOV     #RPT1K,-
   (6)  020122  012746  000002                                                                  MOV     #2,-(SP)
   (3)  020126  010600                                                                          MOV     SP,R0
   (4)  020130  104416                                                                          TRAP    C$PNTS
   (4)  020132  062706  000006                                                                  ADD     #6,SP
 4161   020136                            LET R2 := R2 + #1   ;COUNT PRINTS
   (6)  020136  005202                                                                          INC     R2
 4162   020140                            LET R4 := R4 + #2   ;NEXT
   (6)  020140  062704  000002                                                                  ADD     #2,R4
 4163   020144                            IF R2 EQ #10. THEN  ;
   (6)  020144  020227  000012                                                                  CMP     R2,#10.
   (9)  020150  001014                                                                          BNE     50366$
 4164   020152                              PRINTS #CRLFSP            ;GO TO NEXT PRINT LINE PAST 10 PRINTS
   (7)  020152  012746  005302                                                                  MOV     #CRLFSP,
   (6)  020156  012746  000001                                                                  MOV     #1,-(SP)
```

```
   (3)  020162  010600                                                                          MOV     SP,R0
   (4)  020164  104416                                                                          TRAP    C$PNTS
   (4)  020166  062706  000004                                                                  ADD     #4,SP
 4165   020172                          LET R3 := R3 - #10.       ;ADJUST BAD SPOT COUNT
   (6)  020172  162703  000012                                                                  SUB     #10.,R3
 4166   020176                          LET R2 := R2 - #10.       ;ADJUST PRINT COUNT
   (6)  020176  162702  000012                                                                  SUB     #10.,R2
 4167   020202                        ENDIF                       ;
   (4)  020202                                                                    50366$:
 4168   020202                       UNTIL R2 EQ R3               ;LIMIT: # OF BAD SPOTS
   (3)  020202  020203                                                                          CMP     R2,R3
   (6)  020204  001343                                                                          BNE     50365$
 4169   020206                      ENDIF                        ;
   (4)  020206                                                                    50363$:
 4170   020206                      PRINTS  #CRLF                ;
   (7)  020206  012746  005277                                                                  MOV     #CRLF,-(
   (6)  020212  012746  000001                                                                  MOV     #1,-(SP)
   (3)  020216  010600                                                                          MOV     SP,R0
   (4)  020220  104416                                                                          TRAP    C$PNTS
   (4)  020222  062706  000004                                                                  ADD     #4,SP
 4171   020226  000207                      RTS PC
 4172
 4184                                       .NLIST  BEX
 4185   020230  047045  047045  040445  RPT1A: .ASCIZ  /%N%N%AUNIT %D1%S3%APASS:%D5%S3%ARECORD:%D5%N/
 4186   020305     045  041101  052131  RPT1B: .ASCIZ  /%ABYTES WRITTEN  %D3%A,%Z3%A,%Z3%A,%Z3%N/
 4187   020356  040445  054502  042524  RPT1C: .ASCIZ  /%ABYTES READ REV %D3%A,%Z3%A,%Z3%A,%Z3%N/
 4188   020427     045  041101  052131  RPT1D: .ASCII  /%ABYTES READ FWD %D3%A,%Z3%A,%Z3%A,%Z3%N/
 4189   020477     045  031123  022463         .ASCIZ  /%S23%AWRT%S4%ARDR%S4%ARDF%N/
 4190   020533     045  051101  041505  RPT1F: .ASCIZ  /%ARECOVERABLE ERRORS   %D5%S2%D5%S2%D5%N/
 4191   020604  040445  047125  042522  RPT1G: .ASCIZ  /%AUNRECOVERABLE ERRORS %D5%S2%D5%S2%D5%N/
 4192   020655     045  053501  044522  RPT1E: .ASCIZ  /%AWRITE RETRIES%S8%D5%N/
 4193   020705     045  022516  031104  RPT1J: .ASCIZ  /%N%D2%A BAD SPOTS THIS TAPE PASS PRECEDING RECORD #:/
 4194   020772  042045  022465  030523  RPT1K: .ASCIZ  /%D5%S1/
 4195   021001     045  051501  042520  RPT1I: .ASCII  "%ASPEC COND%S3%AHARD%S3%AFATAL%S3%ACOMPARE%N"
 4196   021055     045  031523  042045         .ASCIZ  /%S3%D5%S3%D5%S3%D5%S3%D5%N%N/
 4197   021112  047045  040445  040524  TAPCAP: .ASCII  /%N%ATAPE LENGTH MUST BE 2400 FT. TO /
 4198   021156  047503  051122  041505         .ASCIZ  /CORRECTLY RUN THIS TEST!!%N/
 4199                                          .LIST   BEX
 4200                                          .EVEN
 4201   021212                                 ENDRPT
   (3)  021212                          L10010:
   (3)  021212  104425                                                                          TRAP    C$RPT
 4202
 4203                                  ;LOAD DEVICE PROTECTION TABLE
 4204                                  ;TABLE FOR SUPERVISOR TO IDENTIFY THE P-TBL FOR THE LOAD DEV
 4205                                  ;THE SUPERVISOR USES THE TBL TO WARN THE OPERATOR WHEN HE TRIES TO TEST THE LOAD
 4206
 4207   021214                                 BGNPROT
   (3)  021214                          L$PROT::
 4208   021214  000000                           .WORD 0              ;P-TBL OFFSET OF TSSR, THE TU80 CSR
 4209   021216  177777                           .WORD -1             ;P-TBL OFFSET OF MASS BUS UNIT #: -1 = NOT A MAS
 4210   021220  177777                           .WORD -1             ;P-TBL OFFSET OF DRIVE #: -1 = NONE, ONE DRIVE P
 4211   021222                                 ENDPROT
```

```
 4213                                           .SBTTL  INITIALIZE SECTION
 4214
 4215                                           ;++
 4216                                           ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
 4217                                           ; AT THE BEGINNING OF EACH PASS.
 4218                                           ;--
 4219
 4220  021222                                           BGNINIT
  (3)  021222                                   L$INIT::
 4221
 4231  021222                                   INIT10: IF #BIT0!BIT1 SFTIN #CMDPKT THEN  ;IF CMD PACKET IS NOT ON MODULO 4 BOUN
  (6)  021222  032727  000003  002314                                                        BIT     #BIT0!BI
  (9)  021230  001421                                                                        BEQ     50367$
 4232  021232                                             ERRSF 1,CMDPKM                ;PRINT ERROR MSG,
  (4)  021232  104454                                                                        TRAP    C$ERSF
  (5)  021234  000001                                                                        .WORD   1
  (5)  021236  004166                                                                        .WORD   CMDPKM
  (5)  021240  000000                                                                        .WORD   0
 4233  021242                                             DELAY 20.                     ;GO TO SUPERVISOR, WAIT 2 SECONDS.
  (2)  021242  012727  000024                                                                MOV     #20.,(PC
  (2)  021246  000000                                                                        .WORD   0
  (2)  021250  013727  002116                                                                MOV     L$DLY,(P
  (2)  021254  000000                                                                        .WORD   0
  (2)  021256  005367  177772                                                                DEC     -6(PC)
  (2)  021262  001375                                                                        BNE     .-4
  (2)  021264  005367  177756                                                                DEC     -22(PC)
  (2)  021270  001367                                                                        BNE     .-20
 4234  021272  000753                                             BR    INIT10          ;
 4235  021274                                           ENDIF
  (4)  021274                                                                                50367$:
 4236
 4237  021274                                           IFB CLRFLG NE #0 THEN         ;IF CLR COUNTERS FLAG SET:
  (6)  021274  105737  002204                                                                TSTB    CLRFLG
  (9)  021300  001413                                                                        BEQ     50370$
 4238  021302  105037  002204                                             CLRB  CLRFLG     ;INIT CLR FLAG.
 4239  021306                                             LET R2 := #0
  (4)  021306  005002                                                                        CLR     R2
 4240  021310                                             WHILE R2 NE #CNTLEN DO
  (4)  021310                                                                                50371$:
  (6)  021310  020227  000550                                                                CMP     R2,#CNTL
  (9)  021314  001405                                                                        BEQ     50372$
 4241  021316                                               LET WRBC(R2) := #0          ;CLR ALL STATISTICAL COUNTERS.
  (4)  021316  005062  002560                                                                CLR     WRBC(R2)
 4242  021322                                               LET R2 := R2 + #2
  (6)  021322  062702  000002                                                                ADD     #2,R2
 4243  021326                                             ENDDO
  (4)  021326  000770                                                                        BR      50371$
  (3)  021330                                                                                50372$:
 4244  021330                                           ENDIF
  (4)  021330                                                                                50370$:
 4245
 4246  021330                                           IFB RRANV NE #0 THEN          ;IF RESET RANDOM VARIABLE FLAG IS SET TH
  (6)  021330  105737  002205                                                                TSTB    RRANV
  (9)  021334  001406                                                                        BEQ     50373$
 4247  021336                                               LET RANB := #RANBC          ;RESET RANDOM BASE #.
  (4)  021336  012737  153624  003442                                                        MOV     #RANBC,R
```

```
4248  021344
 (4)  021344  012737  032561  003444                                                    MOV     #RANSC,R
4249  021352                                    LET RANS := #RANSC              ;RESET RANDOM SAVE LOCATION.
 (4)  021352                                    ENDIF
4250  021352                                                                                    50373$:
 (3)  021352  012700  000040                    READEF  #EF.START               ;READ START COMMAND EVENT FLAG.
                                                                                          MOV     #EF.STAR
 (3)  021356  104447                                                                      TRAP    C$REFG
4251  021360                                    BNCOMPLETE      INIT15          ;BRANCH IF NOT STARTING.
 (2)  021360  103030                                                                      BCC     INIT15
4252  021362                                    LET STAFLG :B= STAFLG + #1       ;SET START COMMAND FLAG.
 (6)  021362  105237  003536                                                              INCB    STAFLG
4253  021366                                    LET R5 := #6
 (4)  021366  012705  000006                                                              MOV     #6,R5
4254  021372                                    LET HERE :B= #0                 ;CLEAR THE 'BEEN HERE BEFORE'' FLAG
 (4)  021372  105037  003341                                                              CLRB    HERE
4255  021376                                    REPEAT                          ;INITIATE UNIT NUMBER TABLE
 (3)  021376                                                                                    50374$:
4256  021376                                      LET DEVTBL(R5) := #NINUSE     ;BY STORING NOT IN USE IN EACH LOCATION.
 (4)  021376  012765  177774  00c036                                                    MOV     #NINUSE,
4257  021404                                      LET R5 := R5 - #2
 (6)  021404  162705  000002                                                              SUB     #2,R5
4258  021410                                    UNTIL R5 EQ #0
 (3)  021410  005705                                                                      TST     R5
 (6)  021412  001371                                                                      BNE     50374$
4259  021414                                    LET R5 := L$UNIT SHIFT 1
 (4)  021414  013705  002012                                                              MOV     L$UNIT,R
 (7)  021420  006305                                                                      ASL     R5
4260  021422                                    REPEAT                          ;STORE ALL UNIT
 (3)  021422                                                                                    50375$:
4261  021422                                      LET R5 := R5 - #2             ;NUMBERS IN DEVTBL.
 (6)  021422  162705  000002                                                              SUB     #2,R5
4262  021426                                      LET DEVTBL(R5) := R5 SHIFT -1
 (4)  021426  010565  002536                                                              MOV     R5,DEVTB
 (7)  021432  006265  002536                                                              ASR     DEVTBL(R
4263  021436                                    UNTIL R5 EQ #0
 (3)  021436  005705                                                                      TST     R5
 (6)  021440  001370                                                                      BNE     50375$
4264
4265  021442                                  INIT15: READEF #EF.PWR            ;HAS THERE BE A POWER FAILURE?
 (3)  021442  012700  000034                                                              MOV     #EF.PWR,
 (3)  021446  104447                                                                      TRAP    C$REFG
4266  021450                                          BNCOMPLETE INIT16         ;BRANCH IF NOT.
 (2)  021450  103004                                                                      BCC     INIT16
4267  021452                                            LET STAFLG :B= STAFLG + #1    ;IF SO - SET THE START FLAG.
 (6)  021452  105237  003536                                                              INCB    STAFLG
4268  021456                                            LET PWRFLG :B= PWRFLG + #1   ;IF SO - SET THE POWER FAIL FLAG.
 (6)  021456  105237  003537                                                              INCB    PWRFLG
4269
4270  021462                                  INIT16: RFLAGS  OPFLAG            ;READ AND STORE FLAGS SET BY OPERATOR
 (3)  021462  104421                                                                      TRAP    C$RFLA
 (3)  021464  010037  003542                                                              MOV     R0,OPFLA
4271  021470                                          LET R3 := #0              ;CLEAR EVENT FLAG
 (4)  021470  005003                                                                      CLR     R3
4272  021472                                              IFB PWRFLG EQ #0 THEN ;IF POWER FAIL HAS NOT OCCURRED THEN:
 (6)  021472  105737  003537                                                              TSTB    PWRFLG
 (9)  021476  001020                                                                      BNE     50376$
```

```
 4273  021500
  (3)  021500  012700  000035                    READEF #EF.NEW            ;UPDATE PASS COUNT WHEN
  (3)  021504  104447                                                                    MOV     #EF.NEW,
                                                                                         TRAP    C$REFG
 4274  021506
  (6)  021506  103014                            IFCOND CS THEN            ;SUPERVISOR IS IN NEW PASS
                                                                                         BCC     50377$
 4275  021510
  (6)  021510  105737  003536                      IFB STAFLG EQ #0 THEN   ;AND DIAG WAS NEITHER STARTED
                                                                                         TSTB    STAFLG
  (9)  021514  001010                                                                    BNE     50400$
 4276  021516
  (3)  021516  012700  000037                        READEF #EF.RES        ;NOR
                                                                                         MOV     #EF.RES,
  (3)  021522  104447                                                                    TRAP    C$REFG
 4277  021524
  (6)  021524  103402                                IFCOND CC THEN        ;RESTARTED
                                                                                         BCS     50401$
 4278  021526
  (6)  021526  005103                                  LET R3 := COMP R3   ;DO IT
                                                                                         COM     R3
 4279  021530
  (4)  021530  000401                                ELSE
                                                                                         BR      50402$
  (3)  021532                                                                  50401$:
 4280  021532
  (6)  021532  005203                                  LET R3 := R3 + #1   ;SET 1ST PASS IF NEW PASS AND
                                                                                         INC     R3
 4281  021534                                        ENDIF                 ;RESTARTING
  (4)  021534                                                                  50402$:
 4282  021534
  (4)  021534  000401                              ELSE
                                                                                         BR      50403$
  (3)  021536                                                                  50400$:
 4283  021536
  (6)  021536  005203                                  LET R3 := R3 + #1   ;SET 1ST PASS IF NEW PASS AND
                                                                                         INC     R3
 4284  021540                                        ENDIF                 ;STARTING
  (4)  021540                                                                  50403$:
 4285  021540                                      ENDIF                   ;DO NOT UPDATE IT ON CONTINUE
  (4)  021540                                                                  50377$:
 4286  021540                                    ENDIF                     ;OR ON POWER FAIL
  (4)  021540                                                                  50376$:
 4287  021540  004737  016614              JSR     PC,FIRSTU               ;INIT DEVICE POINTER.
 4288  021544                              LET R2 := #0                    ;INIT DEVICE COUNTER.
  (4)  021544  005002                                                                    CLR     R2
 4289  021546                              WHILE DEVTBL(R5) NE #END DO
  (4)  021546                                                                  50404$:
  (6)  021546  026527  002536  177777                                                   CMP     DEVTBL(R
  (9)  021554  001450                                                                    BEQ     50405$
 4290  021556                                LET R2 := R2 + #1
  (6)  021556  005202                                                                    INC     R2
 4291  021560                                LET R0 := R5 SHIFT -1
  (4)  021560  010500                                                                    MOV     R5,R0
  (7)  021562  006200                                                                    ASR     R0
 4292  021564                                GPHARD  R0,R0                   ;GET HARDWARE P TABLE FROM SUPER.
  (3)  021564  104442                                                                    TRAP    C$GPHRD
 4293  021566                                IFCOND CS THEN
  (6)  021566  103036                                                                    BCC     50406$
 4294  021570                                  LET TSSR(R5) := (R0)          ;SAVE TSSR ADDRESS.
  (4)  021570  011065  002466                                                            MOV     (R0),TSS
 4295  021574                                  LET TSDB(R5) := (R0)+ - #2    ;SAVE TSDB ADDRESS.
  (4)  021574  012065  002456                                                            MOV     (R0)+,TS
  (6)  021600  162765  000002  002456                                                   SUB     #2,TSDB(
 4296  021606                                  LET TSVCT(R5) := (R0)         ;SAVE INTERRUPT VECTOR ADDRESS.
  (4)  021606  011065  002476                                                            MOV     (R0),TSV
```

```
4297  021612                          SETVEC TSVCT(R5),TS4INT(R5),#INTPRI ;SET UP INTERUPT PROCESSING COND
 (7)  021612  012746  000340                                                MOV     #INTPRI,
 (6)  021616  016546  002516                                                MOV     TS4INT(R
 (5)  021622  016546  002476                                                MOV     TSVCT(R5
 (4)  021626  012746  000003                                                MOV     #3,-(SP)
 (3)  021632  104437                                                        TRAP    C$SVEC
 (2)  021634  062706  000010                                                ADD     #10,SP
4298  021640                          IF R3 NE #0 THEN            ;ACTUAL PASSCOUNT UPDATE PER R3
 (6)  021640  005703                                                        TST     R3
 (9)  021642  001410                                                        BEQ     50407$
4299  021644                            IF R3 LT #0 THEN
 (6)  021644  005703                                                        TST     R3
 (9)  021646  002003                                                        BGE     50410$
4300  021650                              LET PASCNT(R5) := PASCNT(R5) + #1
 (6)  021650  005265  003260                                                INC     PASCNT(R
4301  021654                            ELSE
 (4)  021654  000403                                                        BR      50411$
 (3)  021656                                                        50410$:
4302  021656                              LET PASCNT(R5) := #1
 (4)  021656  012765  000001  003260                                        MOV     #1,PASCN
4303  021664                            ENDIF
 (4)  021664                                                        50411$:
4304  021664                          ENDIF
 (4)  021664                                                        50407$:
4305  021664                        ENDIF
 (4)  021664                                                        50406$:
4306  021664                        LET RECCNT(R5) := #0          ;CLEAR RECORD COUNT
 (4)  021664  005065  003330                                                CLR     RECCNT(R
4307  021670  004737  016662       JSR   PC,NEXTU                ;DO IT FOR ALL DEVICES.
4308  021674                      ENDDO
 (4)  021674  000724                                                        BR      50404$
 (3)  021676                                                        50405$:
4309
4310  021676                      IF R2 EQ #0 THEN              ;IF THERE ARE NO UNITS:
 (6)  021676  005702                                                        TST     R2
 (9)  021700  001026                                                        BNE     50412$
4311  021702                        PRINTF #AUDRPM              ;PRINT ALL UNITS DROPPED,
 (7)  021702  012746  004731                                                MOV     #AUDRPM,
 (6)  021706  012746  000001                                                MOV     #1,-(SP)
 (3)  021712  010600                                                        MOV     SP,R0
 (4)  021714  104417                                                        TRAP    C$PNTF
 (4)  021716  062706  000004                                                ADD     #4,SP
4312  021722                        DELAY 20.                   ;GO TO SUPERVISOR, WAIT 2 SECONDS.
 (2)  021722  012727  000024                                                MOV     #20.,(PC
 (2)  021726  000000                                                        .WORD   0
 (2)  021730  013727  002116                                                MOV     L$DLY,(P
 (2)  021734  000000                                                        .WORD   0
 (2)  021736  005367  177772                                                DEC     -6(PC)
 (2)  021742  001375                                                        BNE     .-4
 (2)  021744  005367  177756                                                DEC     -22(PC)
 (2)  021750  001367                                                        BNE     .-20
4313  021752                        BREAK                       ;GO TO SUPERVISOR, CHECK TTY.
 (3)  021752  104422                                                        TRAP    C$BRK
4314  021754                      DOCLN                         ;DO CLEAN CODE + ABORT PASS.
 (3)  021754  104444                                                        TRAP    C$DCLN
4315  021756                      ENDIF
```

```
  (4)  021756                                                                                    50412$:
4316
4317  021756                                  SETPRI #PRI00                    ;LOWER CPU PRIORITY TO 0
  (3)  021756  012700  000000                                                                    MOV     #PRI00,R
  (3)  021762  104441                                                                            TRAP    C$SPRI
4318  021764                                  IFB IREC EQ #0 AND #ADR NOTSETIN OPFLAG THEN     ;IF ERROR RECOVERY IS EN
  (6)  021764  105737  002210                                                                    TSTB    IREC
  (9)  021770  001145                                                                            BNE     50413$
  (6)  021772  032737  000020  003542                                                            BIT     #ADR,OPF
  (9)  022000  001141                                                                            BNE     50413$
4319  022002  004737  016614                    JSR PC,FIRSTU                    ;AND AUTO-DROP NOT CALLED, THEN SET UP F
4320  022006                                    WHILE DEVTBL(R5) NE #END DO      ;WHILE THERE ARE MORE DEVICES:
  (4)  022006                                                                                    50414$:
  (6)  022006  026527  002536  177777                                                            CMP     DEVTBL(R
  (9)  022014  001533                                                                            BEQ     50415$
4321  022016                                      BEGIN COUNTER                  ;START 3.5 MINUTE COUNTER
4322  022016                                        INCR TIME1 FROM #1 TO #25 BY #1
  (4)  022016  012737  000001  003446                                                            MOV     #1,TIME1
  (5)  022024  000402                                                                            BR      50417$
  (4)  022026                                                                                    50420$:
  (7)  022026  005237  003446                                                                    INC     TIME1
  (5)  022032                                                                                    50417$:
  (5)  022032  023727  003446  000025                                                            CMP     TIME1,#2
  (7)  022040  003106                                                                            BGT     50421$
4323  022042                                        LET @TSDB(R5) := #GSCPK ;AND GET UNITS STATUS
  (4)  022042  012775  002324  002456                                                            MOV     #GSCPK,@
4324  022050                                        DELAY 32.                    ;WAIT 3.2 MSEC.
  (2)  022050  012727  000040                                                                    MOV     #32.,(PC
  (2)  022054  000000                                                                            .WORD   0
  (2)  022056  013727  002116                                                                    MOV     L$DLY,(P
  (2)  022062  000000                                                                            .WORD   0
  (2)  022064  005367  177772                                                                    DEC     -6(PC)
  (2)  022070  001375                                                                            BNE     .-4
  (2)  022072  005367  177756                                                                    DEC     -2(PC)
  (2)  022076  001367                                                                            BNE     .-20
4325  022100                                        IF #TS.SSR SETIN @TSSR(R5) THEN
  (6)  022100  032775  000200  002466                                                            BIT     #TS.SSR,
  (9)  022106  001420                                                                            BEQ     50422$
4326  022110                                          IF #TS.OFL NOTSETIN @TSSR(R5) THEN
  (6)  022110  032775  000100  002466                                                            BIT     #TS.OFL,
  (9)  022116  001001                                                                            BNE     50423$
4327  022120                                            LEAVE COUNTER              ;EXIT COUNTER WHEN UNIT ON LINE
  (4)  022120  000456                                                                            BR      50416$
4328  022122                                          ELSE
  (3)  022122                                                                                    50423$:
4329  022122                                            PRINTF #OFLINM,DEVTBL(R5) ;PRINT UNIT OFF LINE EVERY 10 SEC
  (8)  022122  016546  002536                                                                    MOV     DEVTBL(R
  (7)  022126  012746  005213                                                                    MOV     #OFLINM,
  (6)  022132  012746  000002                                                                    MOV     #2,-(SP)
  (3)  022136  010600                                                                            MOV     SP,R0
  (4)  022140  104417                                                                            TRAP    C$PNTF
  (4)  022142  062706  000006                                                                    ADD     #6,SP
4330  022146                                          ENDIF
  (4)  022146                                                                                    50424$:
4331  022146                                        ELSE
  (4)  022146  000412                                                                            BR      50425$
```

```
  (3)  022150                                                                                50422$:
4332   022150                                  PRINTF #NRDYM,DEVTBL(R5)
  (8)  022150  016546  002536                                                                        MOV     DEVTBL(R
  (7)  022154  012746  023102                                                                        MOV     #NRDYM,-
  (6)  022160  012746  000002                                                                        MOV     #2,-(SP)
  (3)  022164  010600                                                                                MOV     SP,R0
  (4)  022166  104417                                                                                TRAP    C$PNTF
  (4)  022170  062706  000006                                                                        ADD     #6,SP
4333   022174                              ENDIF
  (4)  022174                                                                                50425$:
4334   022174                              INCR TIME2 FROM #1 TO #13 BY #1
  (4)  022174  012737  000001  003450                                                               MOV     #1,TIME2
  (5)  022202  000402                                                                                BR      50426$
  (4)  022204                                                                                50427$:
  (7)  022204  005237  003450                                                                        INC     TIME2
  (5)  022210                                                                                50426$:
  (5)  022210  023727  003450  000013                                                               CMP     TIME2,#1
  (7)  022216  003016                                                                                BGT     50430$
4335   022220                                DELAY 200.            ;WAIT FOR UNIT TO BE SET ON-LINE
  (2)  022220  012727  000310                                                                        MOV     #200.,(P
  (2)  022224  000000                                                                                .WORD   0
  (2)  022226  013727  002116                                                                        MOV     L$DLY,(P
  (2)  022232  000000                                                                                .WORD   0
  (2)  022234  005367  177772                                                                        DEC     -6(PC)
  (2)  022240  001375                                                                                BNE     .-4
  (2)  022242  005367  177756                                                                        DEC     -22(PC)
  (2)  022246  001367                                                                                BNE     .-20
4336   022250                                BREAK           ;ALLOW TERMINAL INTERRUPT
  (3)  022250  104422                                                                                TRAP    C$BRK
4337   022252                              ENDINC
  (4)  022252  000754                                                                                BR      50427$
  (3)  022254                                                                                50430$:
4338   022254                            ENDINC
  (4)  022254  000664                                                                                BR      50420$
  (3)  022256                                                                                50421$:
4339   022256                          END COUNTER
  (3)  022256                                                                                50416$:
4340   022256                          IF TIME1 GT #25 THEN        ;IF OFF LINE FOR 3.5 MINUTES
  (6)  022256  023727  003446  000025                                                               CMP     TIME1,#2
  (9)  022264  003404                                                                                BLE     50431$
4341   022266  004737  011552              JSR PC,MOVMSG           ;GET MESSAGE PACKET
4342   022272  004737  012274              JSR PC,TCC1             ;PRINT ERROR AND DROP OFF LINE UNIT
4343   022276                            ENDIF
  (4)  022276                                                                                50431$:
4344                                                                ;REPEAT UNTIL ON LINE OR TIMED OUT.
4345   022276  004737  016662            JSR PC,NEXTU              ;SET UP FOR NEXT UNIT.
4346   022302                          ENDDO
  (4)  022302  000641                                                                                BR      50414$
  (3)  022304                                                                                50415$:
4347   022304                        ENDIF
  (4)  022304                                                                                50413$:
4348   022304                        IFB PWRFLG EQ #0 THEN
  (6)  022304  105737  003537                                                                        TSTB    PWRFLG
  (9)  022310  001026                                                                                BNE     50432$
4349   022312                            MEMORY DATAWT             ;REQUEST MEMORY FROM SUPER FOR RD/WR BUF
  (3)  022312  104431                                                                                TRAP    C$MEM
```

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  (3)  022314  010037  003416                                                                    MOV     R0,DATAW
4350   022320
  (4)  022320  013737  003416  003420                                                            MOV     DATAWT,D
  (6)  022326  062737  004000  003420                                                            ADD     #DATCNT,
4351   022334
  (6)  022334  027727  161056  004000                                                            CMP     @DATAWT,
  (9)  022342  002011                                                                            BGE     50433$
4352   022344
  (7)  022344  012746  022412                                                                    MOV     #MEMOM,-
  (6)  022350  012746  000001                                                                    MOV     #1,-(SP)
  (3)  022354  010600                                                                            MOV     SP,R0
  (4)  022356  104417                                                                            TRAP    C$PNTF
  (4)  022360  062706  000004                                                                    ADD     #4,SP
4353   022364
  (3)  022364  104444                                                                            TRAP    C$DCLN
4354   022366
  (4)  022366                                                                                    50433$:
4355   022366
  (4)  022366                                                                                    50432$:
4356
4357   022366
  (4)  022366  105037  002215                                                                    CLRB    CHGFLG
4358   022372
  (4)  022372  012703  003536                                                                    MOV     #ENDFLG,
4359   022376  004737  011502                                                                    JSR     PC,CLRERR
4360   022402                                                                                    CLR     PWRFLG
  (4)  022402  105037  003537
4361
4362   022406                                                                                    TRAP    C$EXIT
  (3)  022406  104432                                                                            .WORD   L10012-.
  (3)  022410  000104
4374   022412  040445  051106  042505          MEMOM:  .ASCII  /%AFREE MEMO TOO SMALL FOR RD-WR BFRS%N/
       022420  046440  046505  020117
       022426  047524  020117  046523
       022434  046101  020114  047506
       022442  020122  042122  053455
       022450  020122  043102  051522
       022456  047045
4375   022460  040445  042522  046055                  .ASCIZ  /%ARE-LOAD IN LARGER MEMO%N/
       022466  040517  020104  047111
       022474  046040  051101  042507
       022502  020122  042515  047515
       022510  047045     000
4376           022514                                  .EVEN
4377
4378   022514                                          ENDINIT
  (3)  022514                                  L10012:
  (3)  022514  104411                                                                            TRAP    C$INIT
```

```
                                                LET DATARD := DATAWT + #DATCNT        ;SET RD BFR AD

                                                IF @DATAWT LT #DATCNT THEN    ;WHEN NOT ENOUGH FREE MEMO AVAILABLE

                                                  PRINTF #MEMOM               ;WARN OPERATOR

                                                  DOCLN                       ;AND ABORT PASS

                                                ENDIF         ;DIAG MUST BE RE-LOADED IN A CPU WITH LARGER MEMO

                                              ENDIF

                                              LET CHGFLG :B= #0               ;CLR CHANGE CMD SEQ TBL FLAG.

                                              LET R3 := #ENDFLG

                                              JSR     PC,CLRERR               ;CLEAR ALL FLAGS.
                                              LET PWRFLG :B= #0               ;CLEAR THE POWER FAIL FLAG.

                                              EXIT    INIT
```

```
                                        .SBTTL  AUTO DROP SECTION

                                        ;++
                                        ;SECTION EXECUTED AFTER THE INIT CODE WHEN "ADR" FLAG IS SET BY OPERATOR
                                        ;SECTION CHEKS FOR A VALID INTERFACE LOCATION.  DROPS UNIT IF NO RESPONSE
                                        ;FROM INTERFACE
                                        ;--

022516                                          BGNAUTO
022516                                  L$AUTO::

022516  004737  016614                          JSR PC,FIRSTU                   ;FIND FIRST UNIT
022522                                          WHILE DEVTBL(R5) NE #END DO     ;
022522                                                                                  50434$:
022522  026527  002536  177777                                                          CMP     DEVTBL(R
022530  001525                                                                          BEQ     50435$
022532                                            LET TRAPD4 :B= #0             ;
022532  105037  003540                            SETVEC #4,#TRAP4,#PRI07       ;SET VECTOR 4
022536                                                                                  MOV     #PRI07,-
022536  012746  000340                                                                  MOV     #TRAP4,-
022542  012746  023132                                                                  MOV     #4,-(SP)
022546  012746  000004                                                                  MOV     #3,-(SP)
022552  012746  000003                                                                  TRAP    C$SVEC
022556  104437                                                                          ADD     #10,SP
022560  062706  000010
022564                                            LET R2 := @TSSR(R5)           ;ADDRESS TU80 INTERFACE
022564  017502  002466                                                                  MOV     @TSSR(R5
022570                                            CLRVEC #4                     ;CLEAR VECTOR AT 4
022570  012700  000004                                                                  MOV     #4,R0
022574  104436                                                                          TRAP    C$CVEC
022576                                            IFB TRAPD4 NE #0 THEN
022576  105737  003540                                                                  TSTB    TRAPD4
022602  001423                                                                          BEQ     50436$
022604                                              LET FTLCNT(R5) := FTLCNT(R5) + #1
022604  005265  003320                                                                  INC     FTLCNT(R
022610                                              PRINTF #AUTODM,TSSR(R5)     ;PRINT ERROR
022610  016546  002466                                                                  MOV     TSSR(R5)
022614  012746  023006                                                                  MOV     #AUTODM,
022620  012746  000002                                                                  MOV     #2,-(SP)
022624  010600                                                                          MOV     SP,R0
022626  104417                                                                          TRAP    C$PNTF
022630  062706  000006                                                                  ADD     #6,SP
022634                                              LET DROPN := DEVTBL(R5)             ;SAVE # OF UNIT TO BE DROPPED.
022634  016537  002536  017136                                                          MOV     DEVTBL(R
022642                                              LET R0 := R5 SHIFT -1               ;R0=LOGICAL DEVICE NUMBER
022642  010500                                                                          MOV     R5,R0
022644  006200                                                                          ASR     R0
022646                                              DODU R0                     ;DROP THE UNIT: EXEC BGNDU-ENDDU CODE IF
022646  104451                                                                          TRAP    C$DODU
022650                                            ELSE
022650  000452                                                                          BR      50437$
022652                                                                          50436$.
022652                                              LET @TSDB(R5) := #GSCPK     ;SEND GET STATUS COMMAND
022652  012775  002324  002456                                                          MOV     #GSCPK,@
022660  004737  011516                            JSR PC,WSSR                 ;WAIT
022664                                            IF #TS.SSR SETIN @TSSR(R5) THEN
```

```
   (6)  022664  032775  000200  002466                                                    BIT     #TS.SSR,
   (9)  022672  001423                                                                    BEQ     50440$
 4406   022674                        IF #TS.OFL SETIN @TSSR(R5) THEN
   (6)  022674  032775  000100  002466                                                    BIT     #TS.OFL,
   (9)  022702  001416                                                                    BEQ     50441$
 4407   022704                          LET FTLCNT(R5) := FTLCNT(R5) + #1
   (6)  022704  005265  003320                                                          INC     FTLCNT(R
 4408   022710                          PRINTF #OFLINM,DEVTBL(R5)
   (8)  022710  016546  002536                                                          MOV     DEVTBL(R
   (7)  022714  012746  005213                                                          MOV     #OFLINM,
   (6)  022720  012746  000002                                                          MOV     #2,-(SP)
   (3)  022724  010600                                                                  MOV     SP,R0
   (4)  022726  104417                                                                  TRAP    C$PNTF
   (4)  022730  062706  000006                                                          ADD     #6,SP
 4409   022734  004737  017046                          JSR PC,DROPUA
 4410   022740                        ENDIF
   (4)  022740                                                                50441$:
 4411   022740                      ELSE
   (4)  022740  000416                                                                  BR      50442$
   (3)  022742                                                                50440$:
 4412   022742                          LET FTLCNT(R5) := FTLCNT(R5) + #1
   (6)  022742  005265  003320                                                          INC     FTLCNT(R
 4413   022746                          PRINTF #NRDYM,DEVTBL(R5)
   (8)  022746  016546  002536                                                          MOV     DEVTBL(R
   (7)  022752  012746  023102                                                          MOV     #NRDYM,-
   (6)  022756  012746  000002                                                          MOV     #2,-(SP)
   (3)  022762  010600                                                                  MOV     SP,R0
   (4)  022764  104417                                                                  TRAP    C$PNTF
   (4)  022766  062706  000006                                                          ADD     #6,SP
 4414   022772  004737  017046                          JSR PC,DROPUA
 4415   022776                        ENDIF
   (4)  022776                                                                50442$:
 4416   022776                      ENDIF
   (4)  023000                                                                50437$:
 4417   022776  004737  016662                        JSR PC,NEXTU
 4418   023002                      ENDDO
   (4)  023002  000647                                                                  BR      50434$
   (3)  023004                                                                50435$:
 4419
 4420   023004                      ENDAUTO
   (3)  023004                                L10013:
   (3)  023004  104461                                                                  TRAP    C$AUTO
 4421
 4422   023006  040445  052502  020123        AUTODM: .ASCII  /%ABUS TRAP AT %06%N/
        023014  051124  050101  040440
        023022  020124  047445  022466
        023030     116
 4423   023031      45  044501  052116                .ASCIZ  /%AINTERFACE BAD OR NOT SET TO ABOVE AD%N/
        023036  051105  040506  042503
        023044  041040  042101  047440
        023052  020122  047516  020124
        023060  042523  020124  047524
        023066  040440  047502  042526
        023074  040440  022504  000116
 4424   023102  040445  047125  052111        NRDYM:  .ASCIZ  /%AUNIT %D1%A NOT RDY%N/
        023110  022440  030504  040445
```

```
        023116  047040  052117  051040
        023124  054504  047045     000
  4425          023132                          .EVEN
  4426
  4427                                  ;       DEVICE BUS TRAP HANDLER
  4428                                  ;       OUTPUT: TRAPD4 BYTE  1: TRAPED AT 4
  4429                                  ;                            0: NO TRAP
  4430
  4431  023132                          TRAP4:: LET TRAPD4 :B= TRAPD4 + #1                    INCB    TRAPD4
    (6) 023132  105237  003540
  4432  023136  000002                          RTI
  4433
  4434
  4435
```

```
                                        .SBTTL  CLEANUP CODING SECTION

                                        ;++
                                        ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
                                        ; AT THE END OF EACH PASS.
                                        ;--

                                                BGNCLN
                                        L$CLEAN::

                                                JSR     PC,FIRSTU               ;FIND FIRST UNIT.
                                                WHILE DEVTBL(R5) NE #END DO
                                                                                        50443$:
                                                                                                CMP     DEVTBL(R
                                                                                                BEQ     50444$
                                                  JSR PC,WSSR                   ;WAIT FOR UNIT READY OR TIMEOUT.
                                                  CLRVEC        TSVCT(R5)       ;RELEASE INTERRUPT VECTORS FOR ALL DEV.
                                                                                                MOV     TSVCT(R5
                                                                                                TRAP    C$CVEC
                                                  JSR   PC,NEXTU                ;FIND NEXT UNIT.
                                                ENDDO
                                                                                                BR      50443$
                                                                                        50444$:

                                                EXIT    CLN                                     TRAP    C$EXIT
                                                                                                .WORD   L10014-.

                                                .EVEN

                                                ENDCLN
                                        L10014:                                         TRAP    C$CLEAN
```

4437				
4438				
4439				
4440				
4441				
4442				
4443				
4444	023140			
(3)	023140			
4445				
4452				
4453	023140	004737	016614	
4454	023144			
(4)	023144			
(6)	023144	026527	002536	177777
(9)	023152	001410		
4455	023154	004737	011516	
4456	023160			
(3)	023160	016500	002476	
(3)	023164	104436		
4457	023166	004737	016662	
4458	023172			
(4)	023172	000764		
(3)	023174			
4459				
4460	023174			
(3)	023174	104432		
(3)	023176	000002		
4472				
4473				
4474	023200			
(3)	023200			
(3)	023200	104412		

```
                                                .SBTTL  DROP UNIT SECTION

                                                ;++
                                                ; THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                                                ; TO NO LONGER BE TESTED.  THAT CODE SHALL BE EXECUTED WHEN DODU
                                                ;MACRO IS CALLED WHILE IDU FLAG IS NOT SET BY OPERATOR
                                                ;--

                                                        BGNDU
                                                L$DU::

                                                        LET R5 := R0 SHIFT 1            ;R5 = LOGICAL DEVICE NUMBER X 2.
                                                                                                MOV     R0,R5
                                                                                                ASL     R5

                                                        LET DEVTBL(R5) := #NINUSE       ;SET NOT IN USE FLAG FOR THE DEVICE.
                                                                                                MOV     #NINUSE,

                                                        PRINTF  #DROPDM,DROPN           ;PRINT DROP DEVICE MESSAGE
                                                                                                MOV     DROPN,-(
                                                                                                MOV     #DROPDM,
                                                                                                MOV     #2,-(SP)
                                                                                                MOV     SP,R0
                                                                                                TRAP    C$PNTF
                                                                                                ADD     #6.SP

                                                        EXIT    DU                              .WORD   J$JMP
                                                                                                .WORD   L10015-2

                                                        .EVEN

                                                        ENDDU
                                                L10015:                                         TRAP    C$DU
```

```
                                        .SBTTL  ADD UNIT SECTION

                                        ;++
                                        ; THE ADD-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                                        ;  TO BE (A) TESTED FOR THE FIRST TIME, OR (B) RESUMED IN TESTING.  IF
                                        ;  'EF.AUNIT'' IS SET, THE UNIT WILL BE TESTED AS A NEW UNIT.
                                        ;--

                                                BGNAU
                                        L$AU::

                                                LET R5 := R0 SHIFT 1            ;R5 = LOGICAL DEVICE NUMBER X 2.
                                                                                        MOV     R0,R5
                                                                                        ASL     R5
                                                LET DEVTBL(R5) := R0    ;STORE UNIT # IN DEVICE TABLE.
                                                                                        MOV     R0,DEVTB
                                                GPHARD  R0,R0                   ;GET HARDWARE P TABLE FROM SUPER.
                                                                                        TRAP    C$GPHRD
                                                LET TSSR(R5) := (R0)            ;SAVE TSSR ADDRESS.
                                                                                        MOV     (R0),TSS
                                                LET TSDB(R5) := (R0)+ - #2      ;SAVE TSDB ADDRESS.
                                                                                        MOV     (R0)+,TS
                                                                                        SUB     #2,TSDB(
                                                LET TSVCT(R5) := (R0)           ;SAVE INTERRUPT VECTOR ADDRESS.
                                                                                        MOV     (R0),TSV
                                                SETVEC TSVCT(R5),TS4INT(R5),#INTPRI     ;SET UP INTERUPT PROCESSING COND
                                                                                        MOV     #INTPRI,
                                                                                        MOV     TS4INT(R
                                                                                        MOV     TSVCT(R5
                                                                                        MOV     #3,-(SP)
                                                                                        TRAP    C$SVEC
                                                                                        ADD     #10,SP
                                                LET INTFLG(R5) := #0            ;CLEAR INTERRUPT FLAGS.
                                                                                        CLR     INTFLG(R

                                                EXIT    AU
                                                                                        .WORD   J$JMP
                                                                                        .WORD   L10016-2

                                                .EVEN

                                                ENDAU
                                        L10016:
                                                                                        TRAP    C$AU

                                                ENDMOD
```

```
                                .TITLE HARDWARE TESTS

                                .SBTTL  TEST 1:  BASIC FUNCTIONS.

                                ;++
                                ; TEST TO EXECUTE ALL TU80 FUNCTIONS.
                                ;--

                                        BGNMOD

                                        BGNTST
                                T1::

                                        LET RANDOM :B= #0               ;CLR THE RANDOM OPERATIONS FLAG.
                                                                                        CLRB    RANDOM
                                        LET EXPBOT :B= #0               ;CLR EXPECT BOT FLAG.
                                                                                        CLRB    EXPBO.

                                        BGNSUB                          ;SUBTEST 1 - SET CHAR, DRIVE INIT, GET S
                                T1.1:
                                                                                        TRAP    C$BSUB

                                        LET R2 := #BFSEQ0               ;ADR OF CMD SEQ.
                                                                                        MOV     #BFSEQ0,
                                        JSR     PC,BFSEQ                ;SET UP CMD SEQ.
                                        JSR     PC,EXALL                ;EXECUTE CMD SEQ ON ALL DEVICES.
                                        JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
                                        WHILE DEVTBL(R5) NE #END DO     ;WHILE THERE ARE MORE DEVICES:
                                                                                50445$:
                                                                                        CMP     DEVTBL(R
                                                                                        BEQ     50446$
                                          LET R2 := MSGPKA(R5)          ;GET MSG PACKET ADR,
                                                                                        MOV     MSGPKA(R
                                          LET R2 := R2 + #12            ;GET XSTAT2 ADR,
                                                                                        ADD     #12,R2
                                          LET TS4CL(R5) := (R2) CLR.BY #177400  ;STORE CODE LEVEL FROM DTR BYTE,
                                                                                        MOV     (R2),TS4
                                                                                        BIC     #177400,
                                          IF PASCNT(R5) EQ #1 THEN      ;IF THIS IS PASS 1 THEN:
                                                                                        CMP     PASCNT(R
                                                                                        BNE     50447$
                                            PRINTF #CODELM,DEVTBL(R5),TS4CL(R5) ;PRINT THE TU80 MICROCODE LEVEL.
                                                                                        MOV     TS4CL(R5
                                                                                        MOV     DEVTBL(R
                                                                                        MOV     #CODELM,
                                                                                        MOV     #3,-(SP)
                                                                                        MOV     SP,R0
                                                                                        TRAP    C$PNTF
                                                                                        ADD     #10,SP
                                          ENDIF
                                                                                50447$:
                                          JSR   PC,NEXTU                ;FIND NEXT UNIT.
                                        ENDDO
                                                                                        BR      50445$
                                                                                50446$:
```

```
4598  023474
 (3)  023474
 (3)  023474  104403
4599
4600  023476
 (3)  023476
 (3)  023476  104402
4601
4602  023500
 (4)  023500  012702  024252
4603  023504  004737  024154
4604  023510  004737  006760
4605  023514
 (4)  023514  105037  003536
4606  023520
 (3)  023520
 (3)  023520  104403
4607
4608  023522
 (3)  023522
 (3)  023522  104402
4609
4610  023524
 (4)  023524  012702  024264
4611  023530  004737  024154
4612  023534  004737  006760
4613  023540
 (3)  023540
 (3)  023540  104403
4614
4615  023542
 (3)  023542
 (3)  023542  104402
4616
4617  023544
 (4)  023544  012702  024356
4618  023550  004737  024154
4619  023554  004737  006760
4620  023560
 (3)  023560
 (3)  023560  104403
4621
4622  023562
 (3)  023562
 (3)  023562  104402
4623
4624  023564
 (4)  023564  012702  024430
4625  023570  004737  024154
4626  023574  004737  006760
4627  023600
 (3)  023600
 (3)  023600  104403
4628
4629  023602
 (3)  023602
```

```
        ENDSUB
L10020:                                                 TRAP    C$ESUB

        BGNSUB                          ;SUBTEST 2 - REWIND.
T1.2:                                                   TRAP    C$BSUB

        LET R2 := #BFSEQ1               ;ADR OF CMD SEQ.
                                                        MOV     #BFSEQ1,
        JSR     PC,BFSEQ                ;SET UP CMD SEQ.
        JSR     PC,EXALL                ;EXECUTE CMD SEQ ON ALL DEVICES.
        LET STAFLG :B= #0               ;CLEAR START FLAG
                                                        CLRB    STAFLG
        ENDSUB
L10021:                                                 TRAP    C$ESUB

        BGNSUB                          ;SUBTEST 3 - WRITE/VERIFY.
T1.3:                                                   TRAP    C$BSUB

        LET R2 := #BFSEQ2               ;ADR OF CMD SEQ.
                                                        MOV     #BFSEQ2,
        JSR     PC,BFSEQ                ;SET UP CMD SEQ.
        JSR     PC,EXALL                ;EXECUTE CMD SEQ ON ALL DEVICES.
        ENDSUB
L10022:                                                 TRAP    C$ESUB

        BGNSUB                          ;SUBTEST 4 - WRITE TAPE MARK, ERASE.
T1.4:                                                   TRAP    C$BSUB

        LET R2 := #BFSEQ3               ;ADR OF CMD SEQ.
                                                        MOV     #BFSEQ3,
        JSR     PC,BFSEQ                ;SET UP CMD SEQ.
        JSR     PC,EXALL                ;EXECUTE CMD SEQ ON ALL DEVICES.
        ENDSUB
L10023:                                                 TRAP    C$ESUB

        BGNSUB                          ;SUBTEST 5 - SPACE FILES.
T1.5:                                                   TRAP    C$BSUB

        LET R2 := #BFSEQ4               ;ADR OF CMD SEQ.
                                                        MOV     #BFSEQ4,
        JSR     PC,BFSEQ                ;SET UP CMD SEQ.
        JSR     PC,EXALL                ;EXECUTE CMD SEQ ON ALL DEVICES.
        ENDSUB
L10024:                                                 TRAP    C$ESUB

        BGNSUB                          ;SUBTEST 6 - SPACE RECORDS.
T1.6:
```

```
  (3)  023602  104402                                                    TRAP    C$BSUB
4630
4631  023604                        LET R2 := #BFSEQ5          ;ADR OF CMD SEQ.
  (4)  023604  012702  024472                                            MOV     #BFSEQ5,
4632  023610  004737  024154        JSR     PC,BFSEQ           ;SET UP CMD SEQ.
4633  023614  004737  006760        JSR     PC,EXALL           ;EXECUTE CMD SEQ ON ALL DEVICES.
4634  023620                        ENDSUB
  (3)  023620                  L10025:
  (3)  023620  104403                                                    TRAP    C$ESUB
4635
4636  023622                        BGNSUB                     ;SUBTEST 7 - WRITE RFTRY.
  (3)  023622                  T1.7:
  (3)  023622  104402                                                    TRAP    C$BSUB
4637
4638  023624                        LET R2 := #BFSEQ6          ;ADR OF CMD SEQ.
  (4)  023624  012702  024544                                            MOV     #BFSEQ6,
4639  023630  004737  024154        JSR     PC,BFSEQ           ;SET UP CMD SEQ.
4640  023634  004737  006760        JSR     PC,EXALL           ;EXECUTE CMD SEQ ON ALL DEVICES.
4641  023640                        ENDSUB
  (3)  023640                  L10026:
  (3)  023640  104403                                                    TRAP    C$ESUB
4642
4643  023642                        BGNSUB                     ;SUBTEST 8 - READ REV RETRY.
  (3)  023642                  T1.8:
  (3)  023642  104402                                                    TRAP    C$BSUB
4644
4645  023644                        LET R2 := #BFSEQ7          ;ADR OF CMD SEQ.
  (4)  023644  012702  024576                                            MOV     #BFSEQ7,
4646  023650  004737  024154        JSR     PC,BFSEQ           ;SET UP CMD SEQ.
4647  023654  004737  006760        JSR     PC,EXALL           ;EXECUTE CMD SEQ ON ALL DEVICES.
4648  023660                        ENDSUB
  (3)  023660                  L10027:
  (3)  023660  104403                                                    TRAP    C$ESUB
4649
4650  023662                        BGNSUB                     ;SUBTEST 9 - READ FWD RETRY.
  (3)  023662                  T1.9:
  (3)  023662  104402                                                    TRAP    C$BSUB
4651
4652  023664                        LET R2 := #BFSEQ8          ;ADR OF CMD SEQ.
  (4)  023664  012702  024630                                            MOV     #BFSEQ8,
4653  023670  004737  024154        JSR     PC,BFSEQ           ;SET UP CMD SEQ.
4654  023674  004737  006760        JSR     PC,EXALL           ;EXECUTE CMD SEQ ON ALL DEVICES.
4655  023700                        ENDSUB
  (3)  023700                  L10030:
  (3)  023700  104403                                                    TRAP    C$ESUB
4656
4657  023702                        BGNSUB                     ;SUBTEST 10- CLEAN.
  (3)  023702                  T1.10:
  (3)  023702  104402                                                    TRAP    C$BSUB
4658
4659  023704                        LET R2 := #BFSEQ9          ;ADR OF CMD SEQ.
  (4)  023704  012702  024662                                            MOV     #BFSEQ9,
4660  023710  004737  024154        JSR     PC,BFSEQ           ;SET UP CMD SEQ.
4661  023714  004737  006760        JSR     PC,EXALL           ;EXECUTE CMD SEQ ON ALL DEVICES.
4662  023720                        ENDSUB
  (3)  023720                  L10031:
```

```
  (3)  023720  104403                                                    TRAP    C$ESUB
4663
4664  023722                                BGNSUB                     ;SUBTEST 11 - WTV SWAPPED DATA BYTES.
  (3)  023722                          T1.11:
  (3)  023722  104402                                                    TRAP    C$BSUB
4665
4666  023724                                LET R2 := #BFSE10          ;ADR OF CMD SEQ.
  (4)  023724  012702  024704                                            MOV     #BFSE10,
4667  023730  004737  024154                JSR     PC,BFSEQ           ;SET UP CMD SEQ.
4668  023734  004737  006760                JSR     PC,EXALL           ;WRITE/VERIFY RECORDS 1 AND 2.
4669  023740                                LET SWBFLG :B= #1          ;ENABLE BYTE SWAPPING.
  (4)  023740  112737  000001  003526                                    MOVB    #1,SWBFL
4670  023746  004737  006760                JSR     PC,EXALL           ;WRITE/VERIFY RECORDS 3 AND 4.
4671  023752                                LET SWBFLG :B= #0          ;DISABLE BYTE SWAPPING.
  (4)  023752  105037  003526                                            CLRB    SWBFLG
4672  023756                                ENDSUB
  (3)  023756                          L10032:
  (3)  023756  104403                                                    TRAP    C$ESUB
4673
4674  023760                                LET R2 := DATAWT + #10.    ;INIT WRITE BUFFER POINTER.
  (4)  023760  013702  003416                                            MOV     DATAWT,R
  (6)  023764  062702  000012                                            ADD     #10.,R2
4675  023770                                WHILE R2 NE DATAWT DO   ;UNTIL 10 BYTES HAVE BEEN SWAPPED.
  (4)  023770                                                          50450$:
  (6)  023770  020237  003416                                            CMP     R2,DATAW
  (9)  023774  001402                                                    BEQ     50451$
4676  023776  000342                          SWAB -(R2)               ;SWAP DATA BYTES IN WRITE BUFFER.
4677  024000                                ENDDO
  (4)  024000  000773                                                    BR      50450$
  (3)  024002                                                          50451$:
4678  024002                                LET T1SWB :B= T1SWB + #1   ;SET T1 SWAP BYTES FLAG FOR "CKDATA" SUB
  (6)  024002  105237  003531                                            INCB    T1SWB
4679
4680  024006                                BGNSUB                     ;SUBTEST 12 - READ SWAPPED DATA BYTES.
  (3)  024006                          T1.12:
  (3)  024006  104402                                                    TRAP    C$BSUB
4681
4682  024010                                LET CMDWRD := #RDR         ;CMD IS READ REV.
  (4)  024010  012737  104401  003430                                    MOV     #RDR,CMD
4683  024016  004737  015504                JSR     PC,VFEXC           ;VERIFY ODD LENGTH SWAP (RECORD 4).
4684  024022                                LET CMDPKT+CP.CNT := #12   ;CHANGE BYTE COUNT TO 10.
  (4)  024022  012737  000012  002322                                    MOV     #12,CMDP
4685  024030  004737  015504                JSR     PC,VFEXC           ;VERIFY EVEN LENGTH SWAP (RECORD 3).
4686  024034                                LET SWBFLG :B= #1          ;ENABLE BYTE SWAPPING.
  (4)  024034  112737  000001  003526                                    MOVB    #1,SWBFL
4687  024042                                LET CMDPKT+CP.CNT := #11       ;CHANGE BYTE COUNT TO 9.
  (4)  024042  012737  000011  002322                                    MOV     #11,CMDP
4688  024050  004737  015504                JSR     PC,VFEXC           ;VERIFY ODD LENGTH SWAP (RECORD 2).
4689  024054                                LET CMDPKT+CP.CNT := #12   ;CHANGE BYTE COUNT TO 10.
  (4)  024054  012737  000012  002322                                    MOV     #12,CMDP
4690  024062  004737  015504                JSR     PC,VFEXC           ;VERIFY EVEN LENGTH SWAP (RECORD 1).
4691  024066                                LET CMDWRD := #RDF         ;CMD IS READ FWD.
  (4)  024066  012737  104001  003430                                    MOV     #RDF,CMD
4692  024074  004737  015504                JSR     PC,VFEXC           ;VERIFY EVEN LENGTH SWAP (RECORD 1).
4693  024100                                LET CMDPKT+CP.CNT := #11       ;CHANGE BYTE COUNT TO 9.
  (4)  024100  012737  000011  002322                                    MOV     #11,CMDP
```

```
 4694  024106  004737  015504                        JSR     PC,VFEXC            ;VERIFY ODD LENGTH SWAP (RECORD 2).
 4695  024112                                        LET SWBFLG :B= #0           ;DISABLE BYTE SWAPPING.
  (4)  024112  105037  003526                                                    CLRB    SWBFLG
 4696  024116                                        LET CMDPKT+CP.CNT := #12    ;CHANGE BYTE COUNT TO 10.
  (4)  024116  012737  000012  002322                                           MOV     #12,CMDP
 4697  024124  004737  015504                        JSR     PC,VFEXC            ;VERIFY EVEN LENGTH SWAP (RECORD 3).
 4698  024130                                        LET CMDPKT+CP.CNT := #11    ;CHANGE BYTE COUNT TO 9.
  (4)  024130  012737  000011  002322                                           MOV     #11,CMD?
 4699  024136  004737  015504                        JSR     PC,VFEXC            ;VERIFY ODD LENGTH SWAP (RECORD 4).
 4700
 4701  024142                                        ENDSUB
  (3)  024142                                L10033:
  (3)  024142  104403                                                           TRAP    C$ESUB
 4702
 4703  024144                                        LET T1SWB :B= #0            ;CLEAR T1 SWAP BYTES FLAG
  (4)  024144  105037  003531                                                    CLRB    T1SWB
 4704
 4705
 4706  024150                                        EXIT    TST
  (3)  024150  104432                                                           TRAP    C$EXIT
  (3)  024152  000554                                                           .WORD   L10017-.
```

```
4708
4709
4710
4711
4712
4713
4714  024154
 (4)  024154  012701  003544
4715  024160
 (4)  024160
 (6)  024160  021227  177777
 (9)  024164  001402
4716  024166
 (4)  024166  012221
4717  024170
 (4)  024170  000773
 (3)  024172
4718  024172
 (4)  024172  012711  177777
4719  024176  000207
4720
4721
4722
4723
4724
4725  024200  140004
4726  024202  000200
4727  024204  000001
4728  024206  000000
4729  024210  100013
4730  024212  000001
4731  024214  000001
4732  024216  000000
4733  024220  140004
4734  024222  000020
4735  024224  000001
4736  024226  000000
4737  024230  100017
4738  024232  000001
4739  024234  000001
4740  024236  000000
4741  024240  140004
4742  024242  000040
4743  024244  000001
4744  024246  000000
4745  024250  177777
4746
4747  024252  102010
4748  024254  000001
4749  024256  000002
4750  024260  000000
4751  024262  177777
4752
4753  024264  104105
4754  024266  004000
4755  024270  000001

;       SUBROUTINE TO MOVE A COMMAND SEQUENCE TO THE SEQUENCE TABLE.
;       INPUTS:         R2 = FWA OF COMMAND SEQUENCE.
;       OUTPUTS:
;       REGISTERS:
;       CALLS:

BFSEQ:  LET R1 := #CMDSEQ               ;INIT SEQ TABLE ADDRESS.
                                                        MOV     #CMDSEQ,
        WHILE (R2) NE #END DO           ;WHILE THERE ARE MORE COMMANDS:
                                                    50452$:
                                                        CMP     (R2),#EN
                                                        BEQ     50453$
          LET (R1)+ := (R2)+            ;MOVE COMMANDS TO SEQ TABLE.
                                                        MOV     (R2)+,(R
        ENDDO
                                                        BR      50452$
                                                    50453$:
        LET (R1) := #END                ;STORE END OF SEQUENCE CODE.
                                                        MOV     #END,(R1
        RTS     PC                      ;RETURN.


;       BASIC FUNCTION COMMAND SEQUENCE

BFSEQ0: .WORD   SCH                     ;SET CHAR. 200.         (1)
                200
                1
                0
                DRI                     ;DRIVE INIT.            (2)
                1
                1
                0
                SCH                     ;SET CHAR. 20           (3)
                20
                1
                0
                GES                     ;GET STATUS.            (4)
                1
                1
                0
                SCH                     ;SET CHAR. 40.          (5)
                40
                1
                0
        .WORD   END

BFSEQ1:         RWD                     ;REWIND TWICE.          (6)
                1
                2
                0
        .WORD   END

BFSEQ2.         WTV                     ;WRITE/VERIFY PAT 1.    (7)
                DATCNT
                1
```

```
 4756  024272  000001                                    1
 4757  024274  104105                                    WTV             ;WTV PAT 2.             (8)
 4758  024276  004000                                    DATCNT
 4759  024300  000001                                    1
 4760  024302  000002                                    2
 4761  024304  104105                                    WTV             ;WTV PAT 3.             (9)
 4762  024306  004000                                    DATCNT
 4763  024310  000001                                    1
 4764  024312  000003                                    3
 4765  024314  104105                                    WTV             ;WTV PAT 4.             (10)
 4766  024316  004000                                    DATCNT
 4767  024320  000001                                    1
 4768  024322  000004                                    4
 4769  024324  104105                                    WTV             ;WTV PAT 5.             (11)
 4770  024326  004000                                    DATCNT
 4771  024330  000001                                    1
 4772  024332  000005                                    5
 4773  024334  104105                                    WTV             ;WTV PAT 6.             (12)
 4774  024336  004000                                    DATCNT
 4775  024340  000001                                    1
 4776  024342  000006                                    6
 4777  024344  104105                                    WTV             ;WTV PAT 0.             (13)
 4778  024346  004000                                    DATCNT
 4779  024350  000001                                    1
 4780  024352  000000                                    0
 4781  024354  177777                        .WORD       END
 4782
 4783  024356  100011                BFSEQ3:             WTM             ;WRITE TAPE MARK.       (14)
 4784  024360  000001                                    1
 4785  024362  000001                                    1
 4786  024364  000000                                    0
 4787  024366  104005                                    WRT             ;WRITE 10 RECORDS.      (15)
 4788  024370  004000                                    DATCNT
 4789  024372  000010                                    10
 4790  024374  000001                                    1
 4791  024376  100411                                    ERS             ;ERASE 10 TIMES.        (16)
 4792  024400  000001                                    1
 4793  024402  000010                                    10
 4794  024404  000000                                    0
 4795  024406  100011                                    WTM             ;WRITE TAPE MARK.       (17)
 4796  024410  000001                                    1
 4797  024412  000001                                    1
 4798  024414  000000                                    0
 4799  024416  101011                                    WTR             ;WTM RETRY              (18)
 4800  024420  000001                                    1
 4801  024422  000001                                    1
 4802  024424  000000                                    0
 4803  024426  177777                        .WORD       END
 4804
 4805  024430  105410                BFSEQ4:             SFR             ;SPACE 2 FILES REV.     (19)
 4806  024432  000002                                    2
 4807  024434  000001                                    1
 4808  024436  000000                                    0
 4809  024440  105010                                    SFF             ;SPACE 2 FILES FWD.     (20)
 4810  024442  000002                                    2
 4811  024444  000001                                    1
```

```
4812  024446  000000                          0
4813  024450  105410                          SFR             ;SPACE 2 FILES REV.     (21)
4814  024452  000001                          1
4815  024454  000002                          2
4816  024456  000000                          0
4817  024460  105010                          SFF             ;SPACE 2 FILES FWD.     (22)
4818  024462  000001                          1
4819  024464  000002                          2
4820  024466  000000                          0
4821  024470  177777                  .WORD   END
4822
4823  024472  102010          BFSEQ5:         RWD             ;REWIND.                (23)
4824  024474  000001                          1
4825  024476  000001                          1
4826  024500  000000                          0
4827  024502  104010                          SRF             ;SPACE 7 RECORDS FWD.   (24)
4828  024504  000007                          7
4829  024506  000001                          1
4830  024510  000000                          0
4831  024512  104410                          SRR             ;SPACE 7 RECORDS REV.   (25)
4832  024514  000007                          7
4833  024516  000001                          1
4834  024520  000000                          0
4835  024522  104010                          SRF             ;SPACE 7 RECORDS FWD.   (26)
4836  024524  000001                          1
4837  024526  000007                          7
4838  024530  000000                          0
4839  024532  104410                          SRR             ;SPACE 7 RECORDS REV.   (27)
4840  024534  000001                          1
4841  024536  000007                          7
4842  024540  000000                          0
4843  024542  177777                  .WORD   END
4844
4845  024544  102010          BFSEQ6:         RWD             ;REWIND.                (28)
4846  024546  000001                          1
4847  024550  000001                          1
4848  024552  000000                          0
4849  024554  104005                          WRT             ;WRITE.                 (29)
4850  024556  004000                          DATCNT
4851  024560  000001                          1
4852  024562  000001                          1
4853  024564  105005                          WRR             ;WRITE RETRY.           (30)
4854  024566  004000                          DATCNT
4855  024570  000001                          1
4856  024572  000001                          1
4857  024574  177777                  .WORD   END
4858
4859  024576  104401          BFSEQ7:         RDR             ;READ REV.              (31)
4860  024600  004000                          DATCNT
4861  024602  000001                          1
4862  024604  000001                          1
4863  024606  105401                          RNR             ;READ NEXT REV.         (32)
4864  024610  004000                          DATCNT
4865  024612  000001                          1
4866  024614  000001                          1
4867  024616  125401                          RNF             ;READ NEXT FWD.         (33)
```

```
 4868  024620  004000                                DATCNT
 4869  024622  000001                                1
 4870  024624  000001                                1
 4871  024626  177777                        .WORD   END
 4872
 4873  024630  104001                BFSEQ8:         RDF             ;READ FWD.              (34)
 4874  024632  004000                                DATCNT
 4875  024634  000001                                1
 4876  024636  000001                                1
 4877  024640  105001                                RPF             ;READ PREVIOUS FWD.     (35)
 4878  024642  004000                                DATCNT
 4879  024644  000001                                1
 4880  024646  000001                                1
 4881  024650  125001                                RPR             ;READ PREVIOUS REV.     (36)
 4882  024652  004000                                DATCNT
 4883  024654  000001                                1
 4884  024656  000001                                1
 4885  024660  177777                        .WORD   END
 4886
 4887  024662  101012                BFSEQ9: .WORD   CLN             ;CLEAN.                 (37)
 4888  024664  000001                                1
 4889  024666  000001                                1
 4890  024670  000000                                0
 4891  024672  102010                                RWD             ;REWIND                 (38)
 4892  024674  000001                                1
 4893  024676  000001                                1
 4894  024700  000000                                0
 4895  024702  177777                        .WORD   END             ;END OF SEQUENCE.
 4896
 4897  024704  104105                BFSE10:         WTV             ;WRITE/VERIFY EVEN LENGTH.      (39)
 4898  024706  000012                                12
 4899  024710  000001                                1
 4900  024712  000000                                0
 4901  024714  104105                                WTV             ;WRITE/VERIFY ODD LENGTH.       (40)
 4902  024716  000011                                11
 4903  024720  000001                                1
 4904  024722  000000                                0
 4905  024724  177777                        .WORD   END
 4906                                          .EVEN
 4907
 4908  024726                                ENDTST
   (3) 024726                        L10017:
   (3) 024726  104401                                                      TRAP    C$ETST
```

```
                                        .SBTTL  TEST 2: DATA RELIABILITY.

                                        ;++
                                        ; TEST TO CHECK THE DATA RELIABILITY OF THE TU80.
                                        ;--
                                                BGNTST
                                        T2::

                                                LET RANDOM :B= #1               ;SET THE RANDOM OPERATIONS FLAG.
                                                                                        MOVB    #1,RANDO
                                                LET EXPBOT :B= #0               ;CLEAR EXPECT BOT FLAG.
                                                                                        CLRB    EXPBOT
                                                LET R2 := #DATCNT - #1          ;SET UP THE RECORD LENGTH MASK.
                                                                                        MOV     #DATCNT,
                                                                                        DEC     R2
                                                LET LENMSK := COMP R2           ;ALLOW MAXIMUM BUFFER.
                                                                                        MOV     R2,LENMS
                                                                                        COM     LENMSK
                                                JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
                                                IFB STAFLG NE #0 THEN           ;IF STARTING THEN:
                                                                                        TSTB    STAFLG
                                                                                        BEQ     50454$
                                                  JSR   PC,SETRW                ;CMD2=REWIND
                                                  LET STAFLG :B= #0             ;CLR START FLAG.
                                                                                        CLRB    STAFLG
                                                ENDIF
                                                                                50454$:
                                                LET (R1)+ := #WTV               ;CMD3 = WRITE/ VERIFY.
                                                                                        MOV     #WTV,(R1
                                                LET (R1)+ := #DATCNT            ;SET BRF TO MAX FOR PATTERN GENERATION.
                                                                                        MOV     #DATCNT,
                                                LET R2 := COMP #RNOPSC
                                                                                        MOV     #RNOPSC,
                                                                                        COM     R2
                                                LET (R1)+ := R2                 ;31 OPERATIONS.
                                                                                        MOV     R2,(R1)+
                                                LET (R1)+ := #RANP              ;RANDOM PATTERN.
                                                                                        MOV     #RANP,(R
                                                REPEAT                          ;REPEAT TO EOT:
                                                                                50455$:
                                                  WHILE R1 LT #SEQEND DO        ;FILL SEQ TBL WITH RANDOM CMDS.
                                                                                50456$:
                                                                                        CMP     R1,#SEQE
                                                                                        BGE     50457$
                                                    LET RANS := RANS + RANB
                                                                                        ADD     RANB,RAN
                                                    LET R2 := RANS CLR.BY #177741  ;R2 = RANDOM # (0 - 36).
                                                                                        MOV     RANS,R2
                                                                                        BIC     #177741,
                                                    JSR PC,@RANCMD(R2)          ;SET UP A RANDOM CMD + BRF.
                                                  ENDDO
                                                                                        BR      50456$
                                                                                50457$:
                                                  LET (R1) := #END              ;STORE END OF SEQUENCE CODE IN TABLE.
                                                                                        MOV     #END,(R1
                                                  JSR   PC,EXALL                ;GO EXECUTE ALL CMDS IN SEQUENCE TABLE.
```

```
 4939  025070                                  LET R1 := #CMDSEQ              ;INIT CMD SEQ TBL POINTER,
  (4)  025070  012701  003544                                                        MOV     #CMDSEQ,
 4940  025074                                  UNTIL R2 NE #0                 ;REPEAT UNTIL EOT IS REACHED
  (3)  025074  005702                                                                TST     R2
  (6)  025076  001753                                                                BEQ     50455$
 4941  025100                                  LET ALLEOT :B= ALLEOT + #1     ;FLAG ALL UNITS @ EOT
  (6)  025100  105237  003532                                                        INCB    ALLEOT
 4942  025104  000240                          NOP
 4943  025106  000240                          NOP
 4944  025110  000240                          NOP
 4945  025112  004737  027072                  JSR     PC,T5WEOT              ;WRITE ONE RECORD BEYOND EOT ON ALL UNIT
 4946                                                                         ;SO THAT SHORTER READ STOP DISTANCE
 4947                                                                         ;SHALL POSITION HEAD IN CLEAN IRG GAP
 4948                                                                         ;READ REV THAT EXTRA REC TO RE-POSITION
 4949  025116  004737  025250                  JSR     PC,RANRD               ;SET UP READ REV/FWD CMDS,
 4950  025122                                  LET CMDSEQ+4 := COMP #RNOPSC   ;# OF RECORDS FOR READ REV.
  (6)  025122  012737  177740  003550                                                MOV     #RNOPSC,
  (6)  025130  005137  003550                                                        COM     CMDSEQ+4
 4951  025134                                  LET CMDSEQ+14 := CMDSEQ+4      ;# OF RECORDS FOR READ FORWARD.
  (4)  025134  013737  003550  003560                                                MOV     CMDSEQ+4
 4952  025142                                  LET (R1) := #END               ;STORE END OF SEQUENSE CODE IN SEQ TABLE
  (4)  025142  012711  177777                                                        MOV     #END,(R1
 4953  025146  004737  006760                  JSR     PC,EXALL               ;GO EXECUTE READ REV/FWD OF LAST N RECOR
 4954  025152                                  LET ALLEOT :B= #0              ;CLEAR ALL UNITS @ EOT FLAG
  (4)  025152  105037  003532                                                        CLRB    ALLEOT
 4955  025156                                  LET RPTFLG :B= #1              ;REQUEST PERFORMANCE REPORT DURING REWIN
  (4)  025156  112737  000001  003525                                                MOVB    #1,RPTFL
 4956  025164                                  LET R1 := #CMDSEQ              ;INIT SEQ TBL POINTER,
  (4)  025164  012701  003544                                                        MOV     #CMDSEQ,
 4957  025170  004737  006740                  JSR PC,SETRW                   ;STORE REWIND IN SEQ TBL,
 4958  025174                                  LET (R1) := #END               ;STORE END IN SEQ TBL,
  (4)  025174  012711  177777                                                        MOV     #END,(R1
 4959  025200  004737  006760                  JSR PC,EXALL                   ;EXECUTE REWIND CMD ON ALL UNITS
 4960
 4961  025204                                  EXIT    TST
  (3)  025204  104432                                                                TRAP    C$EXIT
  (3)  025206  000174                                                                .WORD   L10034-
 4962
```

```
                                        ;       ADDRESSES OF SUBROUTINES USED TO SET UP RANDOM OPERATIONS IN
                                        ;       THE DATA RELIABILITY TEST.
                                        ;
025210  025336                          RANCMD: RANWV                   ;WRITE/VERIFY.
025212  025324                                  RANWR                   ;WRITE.
025214  025324                                  RANWR                   ;WRITE.
025216  025324                                  RANWR                   ;WRITE.
025220  025324                                  RANWR                   ;WRITE.
025222  025324                                  RANWR                   ;WRITE.
025224  025324                                  RANWR                   ;WRITE.
025226  025324                                  RANWR                   ;WRITE.
025230  025250                                  RANRD                   ;READ.
025232  025250                                  RANRD                   ;READ.
025234  025250                                  RANRD                   ;READ.
025236  025250                                  RANRD                   ;READ.
025240  025250                                  RANRD                   ;READ.
025242  025250                                  RANRD                   ;READ.
025244  025250                                  RANRD                   ;READ.
025246  025250                                  RANRD                   ;READ.
                                        ;       SUBROUTINE TO SET UP READ COMMANDS IN SEQUENCE TABLE.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R2
                                        ;       CALLS:
025250                                  RANRD:  LET (R1)+ := #RDR               ;STORE READ REV CMD.
(4) 025250  012721  104401                                                              MOV     #RDR,(R1
                                                LET (R1)+ := #DATCNT            ;SET BRF TO MAX FOR READ RANDOM LENGTHS.
025254                                                                                  MOV     #DATCNT,
(4) 025254  012721  004000
                                                LET RANB := RANB + RANS
025260                                                                                  ADD     RANS,RAN
(6) 025260  063737  003444  003442
                                                LET R2 := RANB CLR.BY #RNOPSC
025266                                                                                  MOV     RANB,R2
(4) 025266  013702  003442                                                              BIC     #RNOPSC,
(6) 025272  042702  177740
                                                LET (R1)+ := R2                 ;SET RANDOM # OF OPERATIONS.
025276                                                                                  MOV     R2,(R1)+
(4) 025276  010221
                                                LET (R1)+ := #RANP              ;RANDOM PATTERN.
025300                                                                                  MOV     #RANP,(R
(4) 025300  012721  000007
                                                LET (R1)+ := #RDF               ;STORE READ FWD CMD.
025304                                                                                  MOV     #RDF,(R1
(4) 025304  012721  104001
                                                LET (R1)+ := #DATCNT            ;SET BRF TO MAX TO READ RANDOM LENGTHS.
025310                                                                                  MOV     #DATCNT,
(4) 025310  012721  004000
                                                LET (R1)+ := R2                 ;SET RANDOM # OF OPERATIONS.
025314                                                                                  MOV     R2,(R1)+
(4) 025314  010221
                                                LET (R1)+ := #RANP              ;RANDOM PATTERN.
025316                                                                                  MOV     #RANP,(R
(4) 025316  012721  000007
025322  000207                                 RTS PC
```

```
5006                                    ;       SUBROUTINE TO SET UP A WRITE COMMAND IN THE SEQUENCE TABLE.
5007                                    ;       INPUTS:
5008                                    ;       OUTPUTS:
5009                                    ;       REGISTERS:
5010                                    ;       CALLS:
5011
5012  025324                            RANWR:  LET (R1)+ := #WRT               ;STORE WRITE CMD.
 (4)  025324  012721  104005                                                    MOV     #WRT,(R1
5013  025330  004737  025350                    JSR PC,RANW                     ;STORE BRF, # OF OPERATIONS, PATTERN.
5014  025334  000207                            RTS PC
5015
5016
5017
5018
5019
5020                                    ;       SUBROUTINE TO SET UP A WRITE/VERIFY COMMAND IN THE SEQUENCE TABLE.
5021                                    ;       INPUTS:
5022                                    ;       OUTPUTS:
5023                                    ;       REGISTERS:
5024                                    ;       CALLS:
5025
5026  025336                            RANWV:  LET (R1)+ := #WTV               ;STORE WRITE/VERIFY CMD.
 (4)  025336  012721  104105                                                    MOV     #WTV,(R1
5027  025342  004737  025350                    JSR PC,RANW                     ;STORE BRF, # OF OPERATIONS, PATTERN.
5028  025346  000207                            RTS     PC
5029
5030
5031
5032
5033
5034                                    ;       SUBROUTINE TO STORE BRF, # OF OPERATIONS, PATTERN IN COMMAND
5035                                    ;       SEQUENCE TABLE FOR WRITE AND WRITE/VERIFY COMMANDS.
5036                                    ;       INPUTS:
5037                                    ;       OUTPUTS:
5038                                    ;       REGISTERS:      R2
5039                                    ;       CALLS:
5040
5041  025350                            RANW:   LET (R1)+ := #DATCNT            ;SET BRF TO MAX FOR PATTERN GENERATION.
 (4)  025350  012721  004000                                                    MOV     #DATCNT,
5042                                                                            ;RANDOM BRF WILL BE GENERATED FOR EACH R
5043  025354                                    LET RANB := RANB + RANS
 (6)  025354  063737  003444  003442                                           ADD     RANS,RAN
5044  025362                                    LET R2 := RANB CLR.BY #RNOPSC
 (4)  025362  013702  003442                                                    MOV     RANB,R2
 (6)  025366  042702  177740                                                    BIC     #RNOPSC,
5045  025372                                    LET (R1)+ := R2               ;SET RANDOM # OF OPERATIONS.
 (4)  025372  010221                                                            MOV     R2,(R1)+
5046  025374                                    LET (R1)+ := #RANP            ;RANDOM PATTERN.
 (4)  025374  012721  000007                                                    MOV     #RANP,(R
5047  025400  000207                            RTS PC                        ;RETURN.
5048
5049                                            .EVEN
5050
5051  025402                                    ENDTST
```

```
   (3)  025402                          L10034:
   (3)  025402  104401                                  TRAP    C$ETST
  5052
```

```
5054                                    .SBTTL  TEST 3: WRITE AND READ STREAMING TEST.
5055
5056                                    ;++
5057                                    ;
5058                                    ;       THIS TEST STREAM WRITES 7000 RECORDS OF 1000 BYTES EACH.
5059                                    ;       DATA IS THEN VERIFIED BY READ REVERSE 7000 RECORDS, FOLLOWED
5060                                    ;       BY READ FORWARD THE 7000 RECORDS.  THIS PARTICULAR SEQUENCE IS
5061                                    ;       PERFORMED TWICE ON EACH UNIT UNDER TEST.  ALL STREAMING SPEEDS
5062                                    ;       ARE TESTED FOR BOTH READ AND WRITE OPERATIONS.
5063                                    ;
5064                                    ;--
5065
5066  025404                            BGNTST
 (3)  025404                            T3::
5067  025404                            IFB HERE EQ #0 THEN
 (6)  025404  105737  003341                                                    TSTB    HERE
 (9)  025410  001013                                                            BNE     50460$
5068  025412                             PRINTF #TAPCAP
 (7)  025412  012746  021112                                                    MOV     #TAPCAP,
 (6)  025416  012746  000001                                                    MOV     #1,-(SP)
 (3)  025422  010600                                                            MOV     SP,R0
 (4)  025424  104417                                                            TRAP    C$PNTF
 (4)  025426  062706  000004                                                    ADD     #4,SP
5069  025432                             LET HERE :B= #255.
 (4)  025432  112737  000377  003341                                           MOVB    #255.,HE
5070  025440                            ENDIF
 (4)  025440                                                            50460$:
5071
5072  025440                            LET DOAGIN :B= #0               ;FIRST OF TWO ITERATONS
 (4)  025440  105037  003340                                                    CLRB    DOAGIN
5073  025444                            LET RANDOM :B= #)               ;CLEAR THE RANDOM OPERATIONS FLAG.
 (4)  025444  105037  003523                                                    CLRB    RANDOM
5074  025450                            LET EXPBOT :B= #0               ;CLEAR THE EXPECT BOT FLAG.
 (4)  025450  105037  003522                                                    CLRB    EXPBOT
5075  025454  004737  006714            JSR PC, SETCH                   ;SET CHARACTERISTICS.
5076  025460  004737  006740            JSR PC, SETRW                   ;SET REWIND COMMAND IN BUFFER.
5077  025464                            LET STAFLG :B= #0               ;CLEAR THE START FLAG.
 (4)  025464  105037  003536                                                    CLRB    STAFLG
5078  025470                            LET (R1) := #END                ;PLACE END FLAG IN SEQUENCE TABLE.
 (4)  025470  012711  177777                                                    MOV     #END,(R1
5079  025474  004737  006760            JSR PC, EXALL                   ;REWIND ALL UNITS.
5080
5081  025500  004737  016614            JSR PC, FIRSTU                  ;FIND THE FIRST UNIT TO TEST (UUT)
5082
5083                                    ; ***************************************************************
5084
5085                                    ;WRITE AND READ EACH UNIT IN TURN BEFORE GOING ON TO THE NEXT.
5086
5087                                    ; ***************************************************************
5088
5089  025504                            WHILE DEVTBL(R5) NE #END DO     ;WHILE THERE ARE MORE DEVICES:
 (4)  025504                                                            50461$:
 (6)  025504  026527  002536  177777                                            CMP     DEVTBL(R
 (9)  025512  001546                                                            BEQ     50462$
5090
5091  025514                            LET BTPT := BTADDR(R5)          ;CLEAR BAD SPOT COUNTER
```

```
  (4)  025514  016537  002550  003520                                                  MOV     BTADDR(R
5092   025522
  (4)  025522  005077  155772                                                          CLR     @BTPT
5093   025526
  (4)  025526  112737  000377  003533                                                  MOVB    #255.,ST
5094   025534
  (4)  025534  012701  003544                                                          MOV     #CMDSEQ,
5095   025540
  (4)  025540  012721  104005                                                          MOV     #WRT,(R1
5096   025544
  (4)  025544  012721  001750                                                          MOV     #1000.,(
5097   025550
  (4)  025550  012721  015530                                                          MOV     #7000.,(
5098   025554
  (4)  025554  012721  000005                                                          MOV     #5,(R1)+
5099   025560
  (4)  025560  012711  177777                                                          MOV     #END,(R1
5100
5101   025564
  (4)  025564  012701  003544                                                          MOV     #CMDSEQ,
5102   025570  004737  007722                                                          JSR     PC,SETUP
5103
5104   025574                                                                       50463$:
  (4)  025574
  (6)  025574  023737  003422  003424                                                  CMP     NCNT,NCN
  (9)  025602  002022                                                                  BGE     50464$
5105
5106   025604  004737  007614                                                          JSR     PC,CMDAC
5107   025610  004737  010576                                                          JSR     PC,EXCUTE
5108   025614  004737  011166                                                          JSR     PC,GOWAIT
5109   025620
  (6)  025620  026527  002536  177774                                                  CMP     DEVTBL(R
  (9)  025626  001005                                                                 BNE     50465$
5110   025630
  (4)  025630  013737  003424  003422                                                  MOV     NCNT1,NC
  (6)  025636  005337  003422                                                          DEC     NCNT
5111   025642
  (4)  025642                                                                       50465$:
5112   025642
  (6)  025642  005237  003422                                                          INC     NCNT
5113   025646
  (4)  025646  000752                                                                  BR      50463$
  (3)  025650                                                                       50464$:
5114   025650
  (6)  025650  026527  002536  177774                                                  CMP     DEVTBL(R
  (9)  025656  001453                                                                  BEQ     50466$
5115   025660  004737  017312                                                          JSR     PC,WRITEM
5116   025664                                                                       ;DON'T ERASE AFTER BACKSPACE
  (4)  025664  105037  003534                                                          CLRB    ERSFLG
5117   025670  004737  014374                                                          JSR     PC,BORERS
5118   025674                                                                       ;RELOAD THE COMMAND TABLE
  (4)  025674  012701  003544                                                          MOV     #CMDSEQ,
5119   025700                                                                       ;NOT REALLY NECESSARY FOR WHAT FOLLOWS
  (4)  025700  012721  104005                                                          MOV     #WRT,(R1
5120   025704                                                                       ;1000-BYTE RECORD LENGTH
  (4)  025704  012721  001750                                                          MOV     #1000.,(

                                        LET @BTPT := #0                 ;START FROM BOT
                                        LET STREAM :B= #255.            ;SET FLAG - WE'RE GOING TO STREAM
                                1$:       LET R1 := #CMDSEQ             ;SETUP SEQUENCE TABLE ADDRESS
                                          LET (R1)+ := #WRT             ;WRITE COMMAND
                                          LET (R1)+ := #1000.           ;1000-BYTE RECORD LENGTH.
                                          LET (R1)+ := #7000.           ;WRITE 7000 RECORDS.
                                          LET (R1)+ := #5               ;GENERATE AND WRITE PATTERN 5.
                                          LET (R1)  := #END             ;SET END OF SEQUENCE TABLE.

                                          LET R1 := #CMDSEQ             ;SEQ. TABLE ADDRESS FOR SUBR. 'SETUP'.
                                          JSR PC, SETUP                 ;SETUP THE COMMAND TABLE

                                            WHILE NCNT LT NCNT1 DO      ;WHILE MORE RECORDS SHOULD BE WRITTEN:

                                             JSR PC, CMDAC              ;SAVE ASCII COMMAND FOR ERROR MESSAGE
                                             JSR PC, EXCUTE             ;ISSUE COMMAND TO UNIT.
                                             JSR PC, GOWAIT             ;GO WAIT FOR DONE TO SET
                                        IF DEVTBL(R5) EQ #NINUSE THEN

                                        LET NCNT := NCNT1 - #1

                                        ENDIF

                                             LET NCNT := NCNT + #1      ;UPDATE THE RECORD COUNT

                                            ENDDO                       ;END OF RECORD 'DO' LOOP

                                        IF DEVTBL(R5) NE #NINUSE THEN   ;IF DRIVE DROPPED EXIT

                                        JSR PC, WRITEM                  ;WRITE A TAPE MARK NOW
                                        LET ERSFLG :B= #0               ;DON'T ERASE AFTER BACKSPACE

                                        JSR PC, BORERS                  ;BACKSPACE OVER THE TAPE MARK
                                        LET R1 := #CMDSEQ               ;RELOAD THE COMMAND TABLE

                                        LET (R1)+ := #WRT               ;NOT REALLY NECESSARY FOR WHAT FOLLOWS

                                        LET (R1)+ := #1000.             ;1000-BYTE RECORD LENGTH
```

```
5121  025710
 (4)  025710  012721  015530                LET (R1)+ := #7000.             ;FOR 7000 ITERATIONS
5122  025714                                                                          MOV     #7000.,(
 (4)  025714  012721  000005                LET (R1)+ := #5                 ;DATA PATTERN NUMBER 5
5123  025720                                                                          MOV     #5,(R1)+
 (4)  025720  012711  177777                LET (R1) := #END                ;TABLE TERMINATOR
5124  025724                                                                          MOV     #END,(R1
 (4)  025724  012701  003544                LET R1 := #CMDSEQ                ;TOP OF THE TABLE AGAIN
5125  025730  004737  007722                JSR PC, SETUP                   ;SET UP THE COMMAND TABLE
5126  025734                                LET VFYFLG :B= #1               ;ALLOW THE DATA VERIFY
 (4)  025734  112737  000001  003524                                                MOVB    #1,VFYFL
5127  025742                                LET R5SAVE := R5                ;SAVE R5
 (4)  025742  010537  003462                                                        MOV     R5,R5SAV
5128  025746  004737  015370                JSR PC, VFYDAT                  ;GO OFF AND CHECK REV AND FWD.
5129  025752                                LET R5 := R5SAVE                ;RESTORE R5
 (4)  025752  013705  003462                                                        MOV     R5SAVE,R
5130  025756                                  IF DEVTBL(R5) NE #NINUSE THEN ;IF DRIVE DROPPED EXIT
 (6)  025756  026527  002536  177774                                                CMP     DEVTBL(R
 (9)  025764  001410                                                                BEQ     50467$
5131  025766  105137  003340                COMB    DOAGIN                  ;LOOP CONTROL
5132  025772  001405                        BEQ     2$                      ;IF ZERO, DONE
5133  025774                                LET NCNT := #0                  ;KEEP CONTROL HERE
 (4)  025774  005037  003422                                                        CLR     NCNT
5134  026000  004737  017312                JSR PC, WRITEM                  ;WRITE ANOTHER TAPE MARK
5135  026004  000653                        BR      1$                      ;AND LOOP
5136  026006                                  ENDIF
 (4)  026006                                                                    50467$:
5137  026006                                ENDIF
 (4)  026006                                                                    50466$:
5138  026006                          2$:   LET NCNT := #0                  ;CLEAR RECORD COUNT
 (4)  026006  005037  003422                                                        CLR     NCNT
5139  026012                                LET VFYFLG :B= #0               ;CLEAR VERIFY FLAG
 (4)  026012  105037  003524                                                        CLRB    VFYFLG
5140  026016                                LET EXPBOT :B= #0               ;CLEAR EXPECT BOT FLAG.
 (4)  026016  105037  003522                                                        CLRB    EXPBOT
5141  026022  004737  016662                JSR PC, NEXTU                   ;GET NEXT UNIT TO TEST (UUT).
5142
5143  026026                                ENDDO                           ;END OF UUT LOOP
 (4)  026026  000626                                                                BR      50461$
 (3)  026030                                                                    50462$:
5144
5145  026030                                LET STREAM :B= #0               ;CLEAR STREAMING FLAG FOR OTHER TESTS.
 (4)  026030  105037  003533                                                        CLRB    STREAM
5146
5147  026034                                EXIT    TST                     ;EXIT TEST
 (3)  026034  104432                                                                TRAP    C$EXIT
 (3)  026036  000002                                                                .WORD   L10035-.
5148                                    .EVEN                           ;JUST IN CASE.
5149                                    ENDTST
5150  026040                          L10035:
 (3)  026040                                                                        TRAP    C$ETST
 (3)  026040  104401
```

```
                                        .SBTTL  TEST 4: WRITE COMPATABILITY/WRITE UTILITY.

                                        ;++
                                        ; TEST TO WRITE RECORDS FROM BOT TO EOT.
                                        ;--

026042                                          BGNTST
(3)  026042                             T4::

                                                LET RANDOM :B= #1               ;SET THE RANDOM OPERATIONS FLAG.
(4)  026042  112737  000001  003523                                                    MOVB    #1,RANDO
                                                LET EXPBOT :B= #0               ;CLEAR EXPECT BOT FLAG.
(4)  026050  105037  003522                                                            CLRB    EXPBOT
                                                LET R2 := #DATCNT - #1          ;SET UP THE RECORD LENGTH MASK.
(4)  026054  012702  004000                                                            MOV     #DATCNT,
(6)  026060  005302                                                                    DEC     R2
                                                LET LENMSK := COMP R2           ;ALLOW MAXIMUM BUFFER.
(6)  026062  010237  003440                                                            MOV     R2,LENMS
(6)  026066  005137  003440                                                            COM     LENMSK
                                                JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
                                                JSR PC,SETRW                    ;CMD2=REWIND
                                                LET STAFLG :B= #0               ;CLEAR START FLAG
(4)  026102  105037  003536                                                            CLRB    STAFLG
                                                REPEAT                          ;REPEAT TO EOT.
(3)  026106                                                                             50470$:
                                                  WHILE R1 LT #SEQEND DO        ;WHILE THERE IS MORE ROOM IN SEQ TABLE:
(4)  026106                                                                             50471$:
(6)  026106  020127  003634                                                            CMP     R1,#SEQE
(9)  026112  002003                                                                    BGE     50472$
                                                    JSR PC,RANWR                  ;STORE A WRITE CMD IN SEQUENCE TABLE.
                                                  ENDDO
(4)  026120  000772                                                                    BR      50471$
(3)  026122                                                                             50472$:
                                                  LET (R1) := #END              ;STORE END OF SEQUENCE CODE IN TABLE.
(4)  026122  012711  177777                                                            MOV     #END,(R1
                                                  JSR   PC,EXALL                ;EXECUTE ALL CMDS IN SEQ TBL ON UNITS.
                                                  LET R1 := #CMDSEQ             ;INIT SEQ TBL POINTER,
(4)  026132  012701  003544                                                            MOV     #CMDSEQ,
                                                UNTIL R2 NE #0                  ;REPEAT UNTIL EOT IS REACHED
(3)  026136  005702                                                                    TST     R2
(6)  026140  001762                                                                    BEQ     50470$
                                                LET ALLEOT :B= ALLEOT + #1      ;SET ALL UNITS @ EOT FLAG
(6)  026142  105237  003532                                                            INCB    ALLEOT
                                                NOP
                                                NOP
                                                NOP
                                                JSR     PC,T5WEOT               ;WRITE ONE RECORD BEYOND EOT ON ALL UNIT
                                                                                ;SO THAT SHORTER READ STOP DISTANCE
                                                                                ;SHALL POSITION HEAD IN CLEAN IRG GAP
                                                                                ;READ REV THAT EXTRA REC TO RE-POSITION
                                                LET ALLEOT :B= #0               ;CLEAR ALL UNITS @ EOT FLAG
(4)  026160  105037  003532                                                            CLRB    ALLEOT
                                                JSR PC,SETRW                    ;STORE REWIND IN SEQ TBL.
                                                LET (R1) := #END                ;STORE END IN SEQ TBL.
(4)  026170  012711  177777                                                            MOV     #END,(R1
```

```
 5187  026174  004737  006760                    JSR PC,EXALL                ;EXECUTE REWIND CMD ON ALL UNITS
 5188
 5189  026200                                    EXIT    TST
  (3)  026200  104432                                                        TRAP    C$EXIT
  (3)  026202  000002                                                        .WORD   L10036-.
 5190
 5191                                            .EVEN
 5192
 5193  026204                                    ENDTST
  (3)  026204                            L10036:
  (3)  026204  104401                                                        TRAP    C$ETST
 5194
```

```
5196
5197                                    .SBTTL  TEST 5:  READ COMPATABILITY/READ UTILITY.
5198
5199                                    ;++
5200                                    ; TEST TO READ ENTIRE TAPE FORWARD AND REVERSE.
5201                                    ;--
5202
5203  026206                            BGNTST
 (3)  026206                            T5::
5204
5205  026206                            LET RANDOM :B= #1               ;SET THE RANDOM OPERATIONS FLAG.
 (4)  026206  112737  000001  003523                                    MOVB    #1,RANDO
5206  026214                            LET EXPBOT :B= #1               ;SET EXPECT BOT FLAG.
 (4)  026214  112737  000001  003522                                    MOVB    #1,EXPBO
5207  026222  004737  006714            JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
5208  026226  004737  006740            JSR PC,SETRW                    ;CMD2=REWIND.
5209  026232                            LET STAFLG :B= #0               ;CLEAR START FLAG
 (4)  026232  105037  003536                                            CLRB    STAFLG
5210  026236                            LET (R1)+ := #RDF               ;CMD3 = READ FORWARD.
 (4)  026236  012721  104001                                            MOV     #RDF,(R1
5211  026242                            LET (R1)+ := #DATCNT            ;SET LENGTH TO MAX FOR UNKNOWN LENGTHS.
 (4)  026242  012721  004000                                            MOV     #DATCNT,
5212  026246                            LET (R1)+ := #77777             ;SET RECORD COUNT TO MAX FOR WHOLE TAPE.
 (4)  026246  012721  077777                                            MOV     #77777,(
5213  026252                            LET (R1)+ := #RANP              ;PATTERN = RANDOM.
 (4)  026252  012721  000007                                            MOV     #RANP,(R
5214  026256                            LET (R1) := #END                ;STORE END OF SEQUENCE CODE IN TABLE.
 (4)  026256  012711  177777                                            MOV     #END,(R1
5215  026262  004737  006760            JSR     PC,EXALL                ;EXECUTE ALL CMDS IN SEQ TBL ON ALL UNIT
5216  026266                            LET ALLEOT :B= ALLEOT + #1      ;FLAG TO ALLOW ALL UNITS AT EOT TO READ
 (6)  026266  105237  003532                                            INCB    ALLEOT
5217  026272                            LET R1 := #CMDSEQ               ;INIT CMD SEQ TBL POINTER.
 (4)  026272  012701  003544                                            MOV     #CMDSEQ,
5218  026276                            LET (R1)+ := #RDR               ;CMD1 = READ REVERSE.
 (4)  026276  012721  104401                                            MOV     #RDR,(R1
5219  026302                            LET (R1)+ := #DATCNT            ;SET LENGTH TO MAX FOR UNKNOWN LENGTHS.
 (4)  026302  012721  004000                                            MOV     #DATCNT,
5220  026306                            LET (R1)+ := #77777             ;RECORD COUNT = MAX FOR WHOLE TAPE.
 (4)  026306  012721  077777                                            MOV     #77777,(
5221  026312                            LET (R1)+ := #RANP              ;PATTERN = RANDOM.
 (4)  026312  012721  000007                                            MOV     #RANP,(R
5222  026316                            LET (R1) := #END                ;STORE END OF SEQUENCE CODE IN TABLE.
 (4)  026316  012711  177777                                            MOV     #END,(R1
5223  026322  004737  006760            JSR     PC,EXALL                ;GO EXECUTE READ REV. OF ENTIRE TAPE.
5224  026326                            LET ALLEOT :B= #0               ;CLEAR ALL UNITS @ EOT FLAG
 (4)  026326  105037  003532                                            CLRB    ALLEOT
5225
5226  026332                            EXIT    TST
 (3)  026332  104432                                                    TRAP    C$EXIT
 (3)  026334  000002                                                    .WORD   L10037-.
5227
5228                                    .EVEN
5229
5230  026336                            ENDTST
 (3)  026336                            L10037:
 (3)  026336  104401                                                    TRAP    C$ETST
```

```
                                .SBTTL  TEST 6: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.

                                ;++
                                ; TEST TO EXECUTE  OPERATOR SELECTED COMMAND SEQUENCE.
                                ;--

                                        BGNTST
                                T6::

                                        LET RANDOM :B= #0               ;CLEAR RAMDOM MODE FLAG.
                                                                                CLRB    RANDOM
                                        LET EXPBOT :B= #1               ;SET EXPECT BOT FLAG.
                                                                                MOVB    #1,EXPBO
                                        LET IRE :B= PIRE                ;MOVE INHIBIT RFC ERROR REPORT FLAG.
                                                                                MOVB    PIRE,IRE
                                        JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
                                        LET CMDSEQ+2 := CHAR            ;MOVE CHAR CODE FROM P TBL TO SEQ TBL.
                                                                                MOV     CHAR,CMD
                                        LET R2 := #CMDD                 ;R2 POINTS TO CMD2 IN SOFT P TABLE.
                                                                                MOV     #CMDD,R2
                                        JSR     PC,PTCMDS               ;MOVE CMD 2 FROM P TBL TO SEQ TBL.
                                        JSR     PC,PTCMDS               ;MOVE CMD 3 FROM P TBL TO SEQ TBL.
                                        JSR     PC,PTCMDS               ;MOVE CMD 4 FROM P TBL TO SEQ TBL.
                                        JSR     PC,PTCMDS               ;MOVE CMD 5 FROM P TBL TO SEQ TBL.
                                        JSR     PC,PTCMDS               ;MOVE CMD 6 FROM P TBL TO SEQ TBL.
                                        JSR     PC,PTCMDS               ;MOVE CMD 7 FROM P TBL TO SEQ TBL.
                                        JSR     PC,PTCMDS               ;MOVE END CMD FROM P TBL TO SEQ TBL.
                                        LET JLOOP := #0                 ;CLEAR JMP CMD LOOP COUNT.
                                                                                CLR     JLOOP
                                        LET STAFLG :B= #0               ;CLEAR START FLAG
                                                                                CLRB    STAFLG
                                        LET R1 := #CMDSEQ               ;INIT SEQUENCE TABLE POINTER.
                                                                                MOV     #CMDSEQ,

                                $BRJMP=0        ;ENABLE JMP SUBSTITUTION FOR BR, IF NECESSARY.

                                3$:     WHILE (R1) NE #END DO           ;WHILE THERE ARE CMDS LEFT IN SEQUENCE T
                                                                                50473$:
                                                                                CMP     (R1),#EN
                                                                                BEQ     50474$
                                          CMP   #JMP.C,(R1)             ;IS THIS A JUMP CMD?
                                          BNE   6$                      ;BR IF NOT.
                                          LET R1 := R1 + #2             ;POINT TO BRF.
                                                                                ADD     #2,R1
                                          MOV   (R1)+,JLOC              ;SAVE BRF (LOCATION).
                                          CMP (R1)+,JLOOP               ;HAS LOOP COUNT BE SATISFIED?
                                          BNE   1$                      ;IF NOT, JMP AGAIN.
                                          LET R1 := R1 + #2             ;IF SO, ADJUST SEQ POUNTER
                                                                                ADD     #2,R1
                                          BR    3$                      ;AND GO TO NEXT COMMAND.
                                1$:       LET JLOOP := JLOOP + #1       ;UPDATE THE LOOP COUNT.
                                                                                INC     JLOOP
                                          LET R1 := #CMDSEQ             ;INIT CMD SEQ TABLE POINTER.
                                                                                MOV     #CMDSEQ,
                                2$:       DEC   JLOC                    ;DECR LOCATION COUNTER.
```

```
5272  026522  001751                          BEQ   3$                    ;IF THIS IS THE RIGHT LOCATION TO JMP TO
5273  026524                                  LET R1 := R1 + #10            ;IF NOT, UPDATE SEQ POINTER TO NEXT CMD.
 (6)  026524  062701  000010                                                      ADD     #10,R1
5274  026530  000772                          BR    2$                      ;DO IT AGAIN.
5275  026532  022711  000020          6$:     CMP   #DLY.C,(R1)             ;DELAY?
5276  026536  001026                          BNE   4$                      ;BR IF NOT.
5277  026540                                  LET R1 := R1 + #4             ;R1 = LOCATION OF N COUNT.
 (6)  026540  062701  000004                                                      ADD     #4,R1
5278  026544                                  LET TIME2 := (R1)             ;SAVE N COUNT.
 (4)  026544  011137  003450                                                      MOV     (R1),TIM
5279  026550                          7$:     DELAY 10.                     ;GO TO SUPER-WAIT 1 MSEC.
 (2)  026550  012727  000012                                                      MOV     #10.,(PC
 (2)  026554  000000                                                              .WORD   0
 (2)  026556  013727  002116                                                      MOV     L$DLY,(P
 (2)  026562  000000                                                              .WORD   0
 (2)  026564  005367  177772                                                      DEC     -6(PC)
 (2)  026570  001375                                                              BNE     .-4
 (2)  026572  005367  177756                                                      DEC     -22(PC)
 (2)  026576  001367                                                              BNE     .-20
5280  026600  005337  003450                  DEC   TIME2
5281  026604  001361                          BNE   7$
5282  026606                                  LET R1 := R1 + #4             ;POINT TO NEXT CMD.
 (6)  026606  062701  000004                                                      ADD     #4,R1
5283  026612  000715                          BR    3$                      ;GO CHECK NEXT CMD.
5284  026614  004737  007722          4$:     JSR   PC,SETUP                ;GO SETUP THE COMMAND BLOCK.
5285  026620                                  WHILE NCNT LT NCNT1 DO        ;WHILE THERE ARE RECORDS REMAINING:
 (4)  026620                                                                  50475$:
 (6)  026620  023737  003422  003424                                               CMP     NCNT,NCN
 (9)  026626  002103                                                              BGE     50476$
5286  026630  004737  007614                    JSR PC,CMDAC                ;STORE CMD ASCII IN ERROR MSG.
5287  026634  004737  007254                    JSR PC,EXSUB                ;ISSUE CMD TO ALL,AWAIT INTS,CHECK STATU
5288  026640                                    IF CMDWRD EQ #GES THEN      ;IF CMD IS GET STATUS THEN:
 (6)  026640  023727  003430  100017                                               CMP     CMDWRD,#
 (9)  026646  001002                                                              BNE     50477$
5289  026650  004737  017140                      JSR PC,PRXST              ;PRINT EXTENDED STATUS REGISTERS.
5290  026654                                    ENDIF
 (4)  026654                                                                  50477$:
5291  026654  004737  017222                    JSR PC,CKHAE                ;CHECK HALT AFTER EACH CMD FLAG.
5292  026660                                    LET R2 := #1                ;SET ALL UNITS AT BOT/EOT.
 (4)  026660  012702  000001                                                      MOV     #1,R2
5293  026664  004737  016614                    JSR PC,FIRSTU               ;FIND FIRST UNIT.
5294  026670                                    WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE UNITS:
 (4)  026670                                                                  50500$:
 (6)  026670  026527  002536  177777                                               CMP     DEVTBL(R
 (9)  026676  001426                                                              BEQ     50501$
5295  026700                                      IF #MOD.CO SETIN CMDWRD THEN  ;IF CMD IS REVERSE THEN:
 (6)  026700  032737  000400  003430                                               BIT     #MOD.CO,
 (9)  026706  001406                                                              BEQ     50502$
5296  026710                                        IF #X0.BOT NOTSETIN EOTFLG(R5) THEN  ;IF NOT A  BOT THEN:
 (6)  026710  032765  000002  003510                                               BIT     #X0.BOT,
 (9)  026716  001001                                                              BNE     50503$
5297  026720                                          LET R2 := #0                        ;CLEAR EOT/BOT FLAG.
 (4)  026720  005002                                                                  CLR     R2
5298  026722                                        ENDIF
 (4)  026722                                                                  50503$:
5299  026722                                      ELSE                        ;ELSE IF CMD IS NOT REVERSE:
```

```
  (4)  026722  000411                                                                    BR      50504$
  (3)  026724                                                                        50502$:
5300   026724                          IF #X0.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
  (6)  026724  032765  000001  003510                                                  BIT     #X0.EOT,
  (8)  026732  001404                                                                  BEQ     50505$
  (6)  026734  032737  000001  003430                                                  BIT     #CMD.CO,
  (9)  026742  001001                                                                  BNE     50506$
  (6)  026744                                                                        50505$:
5301                                                                 ;IF NOT AT EOT OR NOT A MOTION CMD THEN
5302   026744                            LET R2 := #0                ;CLEAR EOT/BOT FLAG.
  (4)  026744  005002                                                                  CLR     R2
5303   026746                          ENDIF
  (4)  026746                                                                        50506$:
5304   026746                        ENDIF
  (4)  026746                                                                        50504$:
5305   026746  004737  016662        JSR PC,NEXTU                  ;FIND NEXT UNIT
5306   026752                      ENDDO                           ;
  (4)  026752  000746                                                                  BR      50500$
  (3)  026754                                                                        50501$:
5307   026754                      IF R2 EQ #1 THEN                ;IF ALL UNIT ARE AT EOT/BOT THEN:
  (6)  026754  020227  000001                                                          CMP     R2,#1
  (9)  026760  001016                                                                  BNE     50507$
5308   026762                        LET NCNT1 := NCNT + #1        ;FORCE TERMINATION OF COMMAND.
  (4)  026762  013737  003422  003424                                                  MOV     NCNT,NCN
  (6)  026770  005237  003424                                                          INC     NCNT1
5309   026774                        LET ALLEOT :B= ALLEOT + #1 ;FLAG ALL UNITS AT EOT/BOT TO ALLOW VER
  (6)  026774  105237  003532                                                          INCB    ALLEOT
5310   027000                        IF CMDLG EQ #2 THEN           ;WHEN WRITING IS CURRENT COMMAND
  (6)  027000  023727  003436  000002                                                  CMP     CMDLG,#2
  (9)  027006  001002                                                                  BNE     50510$
5311   027010  004737  027072          JSR PC,T5WEOT               ;GO WRITE/READ REV ONE RECORD BEYOND EOT
5312   027014                        ENDIF
  (4)  027014                                                                        50510$:
5313   027014                      ELSE
  (4)  027014  000402                                                                  BR      50511$
  (3)  027016                                                                        50507$:
5314   027016                        LET ALLEOT :B= #0 ;WHEN NOT ALL @EOT, CLEAR FLAG
  (4)  027016  105037  003532                                                          CLRB    ALLEOT
5315   027022                      ENDIF
  (4)  027022                                                                        50511$:
5316   027022                      LET NCNT := NCNT + #1           ;UPDATE RECORD COUNT.
  (6)  027022  005237  003422                                                          INC     NCNT
5317   027026                      LET PCMDWD := CMDWRD            ;SAVE PREVIOUS COMMAND WORD.
  (4)  027026  013737  003430  003434                                                  MOV     CMDWRD,P
5318   027034                    ENDDO
  (4)  027034  000671                                                                  BR      50475$
  (3)  027036                                                                        50476$:
5319   027036  004737  015370      JSR   PC,VFYDAT                 ;IF LAST CMD WAS A WRITE VERIFY, THEN GO
5320                                                               ;VERIFY THE LAST N RECORDS OF DATA.
5321
5322   027042                    ENDDO
  (4)  027042  000601                                                                  BR      50473$
  (3)  027044                                                                        50474$:
5323
5324           177777                  $BRJMP=-1       ;TURN OFF JMP SUBSTITUTION (SPMACJ CONTROL, ONLY).
5325
```

```
HARDWARE TESTS  MACY11 30(1046)  12-JUL-83  09:44  PAGE 77-11
CZTUVB.P11    12-JUL-83 09:26          TEST 6: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.                    SEQ 0162

                                                 EXIT    TST

  5326  027044                                                                 TRAP    C$EXIT
   (3)  027044  104432                                                        .WORD   L10040-.
   (3)  027046  000130
  5327
```

```
5329
5330                                    ;       SUBROUTINE TO MOVE A COMMAND FROM THE SOFTWARE P TABLE TO
5331                                    ;       THE COMMAND SEQUENCE TABLE.
5332                                    ;       INPUTS:         R2 = POINTER TO SOFT 'P' TABLE
5333                                    ;       OUTPUTS:
5334                                    ;       REGISTERS:      R3.
5335                                    ;       CALLS:
5336
5337  027050                            PTCMDS: LET R3 := (R2)+ - #1 SHIFT +1   ;R3 = COMMAND TABLE INDEX.
 (4)  027050  012203                                                             MOV     (R2)+,R3
 (6)  027052  005303                                                             DEC     R3
 (8)  027054  006303                                                             ASL     R3
5338  027056                                    LET (R1)+ := CMDTBL(R3)         ;MOVE COMMAND WORD.
 (4)  027056  016321  003646                                                     MOV     CMDTBL(R
5339  027062                                    LET (R1)+ := (R2)+              ;MOVE # OF BYTES.
 (4)  027062  012221                                                             MOV     (R2)+,(R
5340  027064                                    LET (R1)+ := (R2)+              ;MOVE # OF OPERATIONS.
 (4)  027064  012221                                                             MOV     (R2)+,(R
5341  027066                                    LET (R1)+ := (R2)+              ;MOVE PATTERN CODE.
 (4)  027066  012221                                                             MOV     (R2)+,(R
5342  027070  000207                           RTS PC
5343
5344                                    ;       SUBROUTINE TO WRITE THEN READ REVERSE ONE RECORD BEYOND EOT
5345                                    ;       INPUTS:
5346                                    ;       OUTPUTS:
5347                                    ;       REGISTERS:
5348                                    ;       CALLS:          CMDAC,EXSUB,CKHAE
5349
5350  027072  000240                    T5WEOT: NOP
5351  027074  000240                            NOP
5352  027076  004737  007254                    JSR PC,EXSUB            ;WRITE ONE RECORD BEYOND EOT
5353  027102  004737  017222                    JSR PC,CKHAE            ;SO THAT READ SHORTER STOP DISTANCE
                                                                        ;SHALL POSITION HEAD IN CLEAN IRG GAP
5354                                            LET PCMDWD := CMDWRD    ;REPOSITION TAPE
5355  027106                                                                MOV     CMDWRD,P
 (4)  027106  013737  003430  003434
5356  027114                                    LET CMDWRD := #RDR      ;BEFORE EXTRA RECORD
 (4)  027114  012737  104401  003430                                          MOV     #RDR,CMD
5357  027122                                    LET CMDLG := #4         ;BY READING REVERSE
 (4)  027122  012737  000004  003436                                          MOV     #4,CMDLG
5358  027130                                    LET CMDPKT := CMDWRD CLR.BY #BRF.C
 (4)  027130  013737  003430  002314                                          MOV     CMDWRD,C
 (6)  027136  042737  004000  002314                                          BIC     #BRF.C,C
5359  027144                                    LET CMDSAV := CMDPKT    ;THAT RECORD TO ALLOW
 (4)  027144  013737  002314  003432                                          MOV     CMDPKT,C
5360  027152                                    LET CMDPKT+CP.ADL := DATARD     ;NEXT COMMAND IN THE
 (4)  027152  013737  003420  002316                                          MOV     DATARD,C
5361  027160  004737  007614                    JSR PC,CMDAC            ;TABLE TO BE EXECUTED
5362  027164  004737  007254                    JSR PC,EXSUB
5363  027170  004737  017222                    JSR PC,CKHAE
5364  027174  000207                           RTS PC
5365                                            .EVEN
5366  027176                                    ENDTST
 (3)  027176                            L10040:
 (3)  027176  104401                                                             TRAP    C$ETST
5367  027200                                    ENDMOD
```

```
                                        .TITLE PARAMETER CODING

                                        .SBTTL  HARDWARE PARAMETER CODING SECTION

5392  027200                                    BGNMOD

                                        ;++
                                        ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
                                        ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                                        ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                                        ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                                        ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                                        ; WITH THE OPERATOR.
                                        ;--

5403  027200                                    BGNHRD
 (3)  027200  000024                                                    .WORD L10041-L$H
 (3)  027202                            L$HARD::
5410  027202                                    GPRMA   TS4ADR,0,0,160002,177564,YES
 (4)  027202  000031                                                    .WORD   T$CODE
 (4)  027204  027226                                                    .WORD   TS4ADR
 (4)  027206  160002                                                    .WORD   T$LOLIM
 (4)  027210  177564                                                    .WORD   T$HILIM
5411  027212                                    GPRMD   TS4VCT,2,0,777,60,776,YES
 (4)  027212  001032                                                    .WORD   T$CODE
 (4)  027214  027243                                                    .WORD   TS4VCT
 (4)  027216  000777                                                    .WORD   777
 (4)  027220  000060                                                    .WORD   T$LOLIM
 (4)  027222  000776                                                    .WORD   T$HILIM

5413  027224                                    EXIT HRD
 (7)  027224  013004                                                    .WORD   T$CODE

                                        .NLIST  BEX
5422  027226  051524  051123  040440  TS4ADR: .ASCIZ  /TSSR ADDRESS/
5423  027243     126  041505  047524  TS4VCT: .ASCIZ  /VECTOR/
                                        .LIST   BEX
                                        .EVEN

5427  027252                                    ENDHRD
 (2)                                                                    .EVEN
 (3)  027252                            L10041:
```

```
 5430                                   .SBTTL  SOFTWARE PARAMETER CODING SECTION
 5431
 5432                                   ;++
 5433                                   ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
 5434                                   ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES  THE
 5435                                   ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
 5436                                   ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
 5437                                   ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
 5438                                   ; WITH THE OPERATOR.
 5439                                   ;--
 5440
 5441  027252                           BGNSFT
  (3)  027252  000504                                                    .WORD L10042-L$S
  (3)  027254                           L$SOFT::
 5442
 5449
 5450  027254                           GPRML   CLRM,0,1,YES
  (4)  027254  000130                                                    .WORD   T$CODE
  (4)  027256  030024                                                    .WORD   CLRM
  (4)  027260  000001                                                    .WORD   1
 5451  027262                           GPRML   RRVM,0,400,YES
  (4)  027262  000130                                                    .WORD   T$CODE
  (4)  027264  030043                                                    .WORD   RRVM
  (4)  027266  000400                                                    .WORD   400
 5452  027270                           GPRML   HAEM,2,1,YES
  (4)  027270  001130                                                    .WORD   T$CODE
  (4)  027272  030072                                                    .WORD   HAEM
  (4)  027274  000001                                                    .WORD   1
 5453  027276                           GPRML   RCVERM,2,400,YES
  (4)  027276  001130                                                    .WORD   T$CODE
  (4)  027300  030116                                                    .WORD   RCVERM
  (4)  027302  000400                                                    .WORD   400
 5454  027304                           GPRML   IRECM,4,1,YES
  (4)  027304  002130                                                    .WORD   T$CODE
  (4)  027306  030140                                                    .WORD   IRECM
  (4)  027310  000001                                                    .WORD   1
 5455  027312                           XFERT   NEXTSP
  (5)  027312  004024                                                    .WORD   T$CODE
 5456  027314                           GPRML   BADTM,4,400,YES
  (4)  027314  002130                                                    .WORD   T$CODE
  (4)  027316  030161                                                    .WORD   BADTM
  (4)  027320  000400                                                    .WORD   400
 5457  027322                           NEXTSP: GPRML   DINTM,6,1,YES
  (4)  027322  003130                                                    .WORD   T$CODE
  (4)  027324  030206                                                    .WORD   DINTM
  (4)  027326  000001                                                    .WORD   1
 5458  027330                           GPRML   IREM,6,400,YES
  (4)  027330  003130                                                    .WORD   T$CODE
  (4)  027332  030231                                                    .WORD   IREM
  (4)  027334  000400                                                    .WORD   400
 5459  027336                           GPRML   RAMM,10,1,YES
  (4)  027336  004130                                                    .WORD   T$CODE
  (4)  027340  030262                                                    .WORD   RAMM
  (4)  027342  000001                                                    .WORD   1
 5460  027344                           GPRML   CHGM,10,400,YES
  (4)  027344  004130                                                    .WORD   T$CODE
```

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                (4)  027346  030301                                                    .WORD   CHGM
                (4)  027350  000400                                                    .WORD   400
             5461    027352                      XFERF   ENDSP1
                (5)  027352  127044                                                    .WORD   T$CODE
             5462    027354                      GPRMD   CHARM,14,0,377,0,777,YES
                (4)  027354  006032                                                    .WORD   T$CODE
                (4)  027356  030320                                                    .WORD   CHARM
                (4)  027360  000377                                                    .WORD   377
                (4)  027362  000000                                                    .WORD   T$LOLIM
                (4)  027364  000777                                                    .WORD   T$HILIM
             5463    027366                      GPRMD   CMD2M,16,D,37,1,33,YES
                (4)  027366  007052                                                    .WORD   T$CODE
                (4)  027370  030345                                                    .WORD   CMD2M
                (4)  027372  000037                                                    .WORD   37
                (4)  027374  000001                                                    .WORD   T$LOLIM
                (4)  027376  000033                                                    .WORD   T$HILIM
             5464    027400                      GPRMD   BPCRM,20,D,-1,1,DATCNT,YES
                (4)  027400  010052                                                    .WORD   T$CODE
                (4)  027402  030353                                                    .WORD   BPCRM
                (4)  027404  177777                                                    .WORD   -1
                (4)  027406  000001                                                    .WORD   T$LOLIM
                (4)  027410  004000                                                    .WORD   T$HILIM
             5465    027412                      GPRMD   NUMBM,22,D,-1,1,77777,YES
                (4)  027412  011052                                                    .WORD   T$CODE
                (4)  027414  030365                                                    .WORD   NUMBM
                (4)  027416  177777                                                    .WORD   -1
                (4)  027420  000001                                                    .WORD   T$LOLIM
                (4)  027422  077777                                                    .WORD   T$HILIM
             5466    027424                      GPRMD   PATTM,24,D,17,0,10,YES
                (4)  027424  012052                                                    .WORD   T$CODE
                (4)  027426  030405                                                    .WORD   PATTM
                (4)  027430  000017                                                    .WORD   17
                (4)  027432  000000                                                    .WORD   T$LOLIM
                (4)  027434  000010                                                    .WORD   T$HILIM
             5467    027436                      GPRMD   CMD3M,26,D,37,1,33,YES
                (4)  027436  013052                                                    .WORD   T$CODE
                (4)  027440  030420                                                    .WORD   CMD3M
                (4)  027442  000037                                                    .WORD   37
                (4)  027444  000001                                                    .WORD   T$LOLIM
                (4)  027446  000033                                                    .WORD   T$HILIM
             5468    027450                      GPRMD   BPCRM,30,D,-1,1,DATCNT,YES
                (4)  027450  014052                                                    .WORD   T$CODE
                (4)  027452  030353                                                    .WORD   BPCRM
                (4)  027454  177777                                                    .WORD   -1
                (4)  027456  000001                                                    .WORD   T$LOLIM
                (4)  027460  004000                                                    .WORD   T$HILIM
             5469    027462                      GPRMD   NUMBM,32,D,-1,1,77777,YES
                (4)  027462  015052                                                    .WORD   T$CODE
                (4)  027464  030365                                                    .WORD   NUMBM
                (4)  027466  177777                                                    .WORD   -1
                (4)  027470  000001                                                    .WORD   T$LOLIM
                (4)  027472  077777                                                    .WORD   T$HILIM
             5470    027474                      GPRMD   PATTM,34,D,17,0,10,YES
                (4)  027474  016052                                                    .WORD   T$CODE
                (4)  027476  030405                                                    .WORD   PATTM
                (4)  027500  000017                                                    .WORD   17
```

```
                                                                        .WORD   T$LOLIM
                                                                        .WORD   T$HILIM
                        GPRMD   CMD4M,36,D,37,1,33,YES
                                                                        .WORD   T$CODE
                                                                        .WORD   CMD4M
                                                                        .WORD   37
                                                                        .WORD   T$LOLIM
                                                                        .WORD   T$HILIM
                        GPRMD   BPCRM,40,D,-1,1,DATCNT,YES
                                                                        .WORD   T$CODE
                                                                        .WORD   BPCRM
                                                                        .WORD   -1
                                                                        .WORD   T$LOLIM
                                                                        .WORD   T$HILIM
                        GPRMD   NUMBM,42,D,-1,1,77777,YES
                                                                        .WORD   T$CODE
                                                                        .WORD   NUMBM
                                                                        .WORD   -1
                                                                        .WORD   T$LOLIM
                                                                        .WORD   T$HILIM
                        GPRMD   PATTM,44,D,17,0,10,YES
                                                                        .WORD   T$CODE
                                                                        .WORD   PATTM
                                                                        .WORD   17
                                                                        .WORD   T$LOLIM
                                                                        .WORD   T$HILIM
                        GPRMD   CMD5M,46,D,37,1,33,YES
                                                                        .WORD   T$CODE
                                                                        .WORD   CMD5M
                                                                        .WORD   37
                                                                        .WORD   T$LOLIM
                                                                        .WORD   T$HILIM
                        GPRMD   BPCRM,50,D,-1,1,DATCNT,YES
                                                                        .WORD   T$CODE
                                                                        .WORD   BPCRM
                                                                        .WORD   -1
                                                                        .WORD   T$LOLIM
                                                                        .WORD   T$HILIM
                        GPRMD   NUMBM,52,D,-1,1,77777,YES
                                                                        .WORD   T$CODE
                                                                        .WORD   NUMBM
                                                                        .WORD   -1
                                                                        .WORD   T$LOLIM
                                                                        .WORD   T$HILIM
                        GPRMD   PATTM,54,D,17,0,10,YES
                                                                        .WORD   T$CODE
                                                                        .WORD   PATTM
                                                                        .WORD   17
                                                                        .WORD   T$LOLIM
                                                                        .WORD   T$HILIM
                        XFER    ENDSP2
                                                                        .WORD   T$CODE
ENDSP1:                 XFER    ENDSP
                                                                        .WORD   T$CODE
ENDSP2:                 GPRMD   CMD6M,56,D,37,1,33,YES
                                                                        .WORD   T$CODE
```

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                                                                                .WORD   CMD6M
                                                                                .WORD   37
                                                                                .WORD   T$LOLIM
                                                                                .WORD   T$HILIM
5482  027644                    GPRMD   BPCRM,60,D,-1,1,DATCNT,YES
(4)   027644  030052                                                            .WORD   T$CODE
(4)   027646  030353                                                            .WORD   BPCRM
(4)   027650  177777                                                            .WORD   -1
(4)   027652  000001                                                            .WORD   T$LOLIM
(4)   027654  004000                                                            .WORD   T$HILIM
5483  027656                    GPRMD   NUMBM,62,D,-1,1,77777,YES
(4)   027656  031052                                                            .WORD   T$CODE
(4)   027660  030365                                                            .WORD   NUMBM
(4)   027662  177777                                                            .WORD   -1
(4)   027664  000001                                                            .WORD   T$LOLIM
(4)   027666  077777                                                            .WORD   T$HILIM
5484  027670                    GPRMD   PATTM,64,D,17,0,10,YES
(4)   027670  032052                                                            .WORD   T$CODE
(4)   027672  030405                                                            .WORD   PATTM
(4)   027674  000017                                                            .WORD   17
(4)   027676  000000                                                            .WORD   T$LOLIM
(4)   027700  000010                                                            .WORD   T$HILIM
5485  027702                    GPRMD   CMD7M,66,D,37,1,33,YES
(4)   027702  033052                                                            .WORD   T$CODE
(4)   027704  030450                                                            .WORD   CMD7M
(4)   027706  000037                                                            .WORD   37
(4)   027710  000001                                                            .WORD   T$LOLIM
(4)   027712  000033                                                            .WORD   T$HILIM
5486  027714                    GPRMD   BPCRM,70,D,-1,1,DATCNT,YES
(4)   027714  034052                                                            .WORD   T$CODE
(4)   027716  030353                                                            .WORD   BPCRM
(4)   027720  177777                                                            .WORD   -1
(4)   027722  000001                                                            .WORD   T$LOLIM
(4)   027724  004000                                                            .WORD   T$HILIM
5487  027726                    GPRMD   NUMBM,72,D,-1,1,77777,YES
(4)   027726  035052                                                            .WORD   T$CODE
(4)   027730  030365                                                            .WORD   NUMBM
(4)   027732  177777                                                            .WORD   -1
(4)   027734  000001                                                            .WORD   T$LOLIM
(4)   027736  077777                                                            .WORD   T$HILIM
5488  027740                    GPRMD   PATTM,74,D,17,0,10,YES
(4)   027740  036052                                                            .WORD   T$CODE
(4)   027742  030405                                                            .WORD   PATTM
(4)   027744  000017                                                            .WORD   17
(4)   027746  000000                                                            .WORD   T$LOLIM
(4)   027750  000010                                                            .WORD   T$HILIM
5489  027752                    GPRMD   CMD8M,76,D,37,1,33,YES
(4)   027752  037052                                                            .WORD   T$CODE
(4)   027754  030456                                                            .WORD   CMD8M
(4)   027756  000037                                                            .WORD   37
(4)   027760  000001                                                            .WORD   T$LOLIM
(4)   027762  000033                                                            .WORD   T$HILIM
5490  027764                    GPRMD   BPCRM,100,D,-1,1,DATCNT,YES
(4)   027764  040052                                                            .WORD   T$CODE
(4)   027766  030353                                                            .WORD   BPCRM
(4)   027770  177777                                                            .WORD   -1
```

SEQ 0169

```
   (4)  027772  000001                                                    .WORD   T$LOLIM
   (4)  027774  004000                                                    .WORD   T$HILIM
5491    027776                      GPRMD   NUMBM,102,D,-1,1,77777,YES
   (4)  027776  041052                                                    .WORD   T$CODE
   (4)  030000  030365                                                    .WORD   NUMBM
   (4)  030002  177777                                                    .WORD   -1
   (4)  030004  000001                                                    .WORD   T$LOLIM
   (4)  030006  077777                                                    .WORD   T$HILIM
5492    030010                      GPRMD   PATTM,104,D,17,0,10,YES
   (4)  030010  042052                                                    .WORD   T$CODE
   (4)  030012  030405                                                    .WORD   PATTM
   (4)  030014  000017                                                    .WORD   17
   (4)  030016  000000                                                    .WORD   T$LOLIM
   (4)  030020  000010                                                    .WORD   T$HILIM
5493    030022          ENDSP:
5494    030022                      XFER    JMPMSG
   (5)  030022  176004                                                    .WORD   T$CODE
```

```
 5496
 5503                                          .NLIST  BEX
 5504  030024  046103  040505  020122  CLRM:   .ASCIZ  /CLEAR COUNTERS/
 5505  030043     122  051505  052105  RRVM:   .ASCIZ  /RESET RANDOM VARIABLES/
 5506  030072  040510  052114  040440  HAEM:   .ASCIZ  /HALT AFTER EACH CMD/
 5507  030116  051120  047111  020124  RCVERM: .ASCIZ  /PRINT SOFT ERRORS/
 5508  030140  047111  044510  044502  IRECM:  .ASCIZ  /INHIBIT RECOVERY/
 5509  030161     102  042101  052040  BADTM:  .ASCIZ  /BAD TAPE SPOT DETECT/
 5510  030206  044504  040523  046102  DINTM:  .ASCIZ  /DISABLE INTERRUPTS/
 5511  030231     111  044116  041111  IREM:   .ASCIZ  /INHIBIT RFC ERROR REPORT/
 5512  030262  033515  032464  020064  RAMM:   .ASCIZ  /M7454 RAM DUMP/
 5513  030301     103  040510  043516  CHGM:   .ASCIZ  /CHANGE CMD SEQ/
 5514  030320  044103  051101  041501  CHARM:  .ASCIZ  /CHARACTERISTICS CODE/
 5515  030345     103  042115  031057  CMD2M:  .ASCIZ  "CMD/2"
 5516  030353     102  043122  041440  BPCRM:  .ASCIZ  /BRF COUNT/
 5517  030365     043  047440  020106  NUMBM:  .ASCIZ  /# OF OPERATIONS/
 5518  030405     120  052101  042524  PATTM:  .ASCIZ  /PATTERN/
 5519                                          .LIST   BEX
 5520          030416                          .EVEN
 5521  030416                          JMPMSG:
 5522  030416                                  EXIT SFT
  (7)  030416  023004                                                    .WORD   T$CODE
 5523
 5524                                          .NLIST  BEX
 5525  030420  046503  027504  000063  CMD3M:  .ASCIZ  "CMD/3"
 5526  030426  046503  027504  000064  CMD4M:  .ASCIZ  "CMD/4"
 5527  030434  046503  027504  000065  CMD5M:  .ASCIZ  "CMD/5"
 5528  030442  046503  027504  000066  CMD6M:  .ASCIZ  "CMD/6"
 5529  030450  046503  027504  000067  CMD7M:  .ASCIZ  "CMD/7"
 5530  030456  046503  027504  000070  CMD8M:  .ASCIZ  "CMD/8"
 5531                                          .LIST   BEX
 5532  030464                                  ENDSFT
  (2)                                                                   .EVEN
  (3)  030464                          L10042:
 5533
 5534                                  ;*****************************************************************************
 5535                                  ;*****************************************************************************
 5536                                  ;       PATCH AREA
 5537
 5538  030464  000100                  PATCH:: .BLKW   64.
 5539                                  ;*****************************************************************************
 5540                                  ;*****************************************************************************
 5541
 5542  030664                                  LASTAD
  (2)                                                                   .EVEN
  (2)  030664  030700                                                   .WORD T$FREE
  (2)  030666  000004                                                   .WORD T$SIZE
  (3)  030670                          L$LAST::
 5543  030670                                  ENDMOD
```

```
                                        .SBTTL  HARD CODED P-TBL

                                        ;++
                                        ;DIAG IS PRE-PARAMETERIZED PER TBL
                                        ;--

                                                BGNSETUP 1
                                                  BGNPTAB
                                                                        .WORD   0
                                                                        .WORD   L10045-.
                                        L10043:
                                                    172522
                                                    224
                                                  ENDPTAB
                                        L10045:
                                                ENDSETUP

                                        .END
```

PARAMETER CODING MACY11 30(1046) 12-JUL-83 09:44 PAGE 80
CZTUVB.P11 12-JUL-83 09:26 CROSS REFERENCE TABLE -- USER SYMBOLS SEQ 0172

```
ACK.C = 100000 G    1958# 2043  2048  2051  2054  2057  2060  2063  2066  2069  2072  2075  2078
                    2081  2084  2087  2090  2093  2096  2099  2102  2105  2108  2111  2114  2116
ADR   = 000020 G    1920# 4318
ALLEOT  003532 G    2318# 2726  2743  2759  2771  3810  4941* 4954* 5176* 5184* 5216* 5224* 5309*
                    5314*
ASSEMB= 000010      1728
ATTNM   004421 G    2481# 3271
AUDRPM  004731 G    2491# 4311
AUTODM  023006      4398  4422#
BADTM   030161      5456  5509#
BADTSW  002211 G    1850# 3349  4134
BFSEQ   024154      4586  4603  4611  4618  4625  4632  4639  4646  4653  4660  4667  4714#
BFSEQ0  024200      4585  4725#
BFSEQ1  024252      4602  4747#
BFSEQ2  024264      4610  4753#
BFSEQ3  024356      4617  4783#
BFSEQ4  024430      4624  4805#
BFSEQ5  024472      4631  4823#
BFSEQ6  024544      4638  4845#
BFSEQ7  024576      4645  4859#
BFSEQ8  024630      4652  4873#
BFSEQ9  024662      4659  4887#
BFSE10  024704      4666  4897#
BGNFLG= 003466      2292# 3109
BINC    015150      3673  3711#
BIT0  = 000001 G    1920# 3161  4231
BIT00 = 000001 G    1920# 2608  3909
BIT01 = 000002 G    1920#
BIT02 = 000004 G    1920#
BIT03 = 000010 G    1920#
BIT04 = 000020 G    1920#
BIT05 = 000040 G    1920#
BIT06 = 000100 G    1920#
BIT07 = 000200 G    1920#
BIT08 = 000400 G    1920#
BIT09 = 001000 G    1920#
BIT1  = 000002 G    1920# 4231
BIT10 = 002000 G    1920#
BIT11 = 004000 G    1920#
BIT12 = 010000 G    1920#
BIT13 = 020000 G    1920#
BIT14 = 040000 G    1920#
BIT15 = 100000 G    1920#
BIT2  = 000004 G    1920#
BIT3  = 000010 G    1920#
BIT4  = 000020 G    1920#
BIT5  = 000040 G    1920#
BIT6  = 000100 G    1920#
BIT7  = 000200 G    1920#
BIT8  = 000400 G    1920#
BIT9  = 001000 G    1920#
BOE   = 000400 G    1920#
BORERS  014374 G    3377  3553  3620# 5117
BPCRM   030353      5464  5468  5472  5476  5482  5486  5490  5516#
BRCPK   002330 G    2148#
BRFCNT  003426 G    2270# 2674* 2675* 2676  2677* 2679  2830* 2896  3674  3675  3889  3894
```

```
BRF.C = 004000 G    1963# 2051  2054  2057  2060  2063  2066  2069  2072  2075  2078  2081  2096
                    2099  2884  3166  3217  3622  3793  5358
BTADDR  002550 G    2221# 2736  3575  4149  5091
BTMSG1  014170      3572  3608#
BTMSG2  014255      3376  3609#
BTMSG3  014325      3592  3610#
BTPT    003520 G    2309# 2736* 2737* 3373  3375  3575* 3576  3577* 3579  4149* 4150  4157  5091*
                    5092*
BTRPT   017762      4135  4148#
BT0     003000 G    2221  2238#
BT1     003052 G    2222  2239#
BT2     003124 G    2223  2240#
BT3     003176 G    2224  2241#
CHAR    002220 G    1858# 5245
CHARM   030320      5462  5514#
CHGFLG  002215 G    1854# 4357*
CHGM    030301      5460  5513#
CHKERR  012004 G    3094  3195#
CH.EAI= 000040 G    1858  1986# 1988  2178  2345
CH.ERI= 000020 G    1987#
CH.ESS= 000200 G    1985#
CKDATA  016200 G    3856  3869  3889#
CKDCNT  016610      3898* 3907  3909  3933  3934* 3936  3942#
CKDFF   016612      3899* 3917  3922* 3927  3935  3936  3943#
CKHAE   017222 G    2684  3629  3638  3656  3827  4050# 5291  5353  5363
CKHRTN  017310      4053  4064#
CLN   = 101012 G    2111# 2400  4887
CLRERR  011502 G    3090  3098  3109# 4359
CLRFLG  002204 G    1845# 4237  4238*
CLRM    030024      5450  5504#
CMDAC   007614 G    2668  2788# 3626  3635  3652  3801  4081  5106  5286  5361
CMDASC  003734 G    2410# 2817
CMDD    002222 G    1859# 5246
CMDLG   003436 G    2274# 2734  2827* 2839* 2846* 2848* 2872* 3349  3393  3507  3515  3625* 3651*
                    3670  3774* 3781* 5310  5357*
CMDPKM  004166 G    2473# 4232
CMDPKT  002314 G    2134# 2543  2551  2552  2679* 2828* 2829* 2831  2836* 2838  2844* 2845  2854*
                    2855* 2861* 2862* 2870* 2873  2875* 2880  2882* 2884* 2885  3035* 3045  3231*
                    3360  3361  3396* 3404* 3622* 3623  3624* 3633* 3634  3647* 3648  3649* 3650*
                    3793* 3795* 3797  3798* 3896  4231  4684* 4687* 4689* 4693* 4696* 4698* 5358*
                    5359  5360*
CMDSAV  003432 G    2272# 2885* 3231  3623* 3634* 3648* 3797* 5359*
CMDSEQ  003544 G    2344# 2635  2664  4073  4079  4714  4939  4950* 4951* 4956  5094  5101  5118
                    5124  5174  5217  5245* 5256  5270
CMDSE2  003554 G    2348#
CMDTBL  003646 G    2377# 2811  5338
CMDWRD  003430 G    2271# 2606  2670  2688  2693  2704  2723  2739  2756  2767  2788  2879  2880*
                    3010  3040  3070  3073  3163  3166  3167  3217  3288  3359  3620  3621* 3622
                    3631  3632* 3633  3645  3646* 3772  3773* 3779  3780* 3793  3807  3818  3832
                    4054  4682* 4691* 5288  5295  5300  5317  5355  5356* 5358
CMD.C0= 000001 G    1981# 2048  2051  2054  2057  2060  2069  2072  2075  2078  2081  2090  2093
                    2102  2105  2693  2739  2767  2842  2868  3818  5300
CMD.C1= 000002 G    1980# 2048  2087  2102  2108  2111  2116  2859
CMD.C2= 000004 G    1979# 2057  2060  2081  2102  2114  2116  2852  2859  2868
CMD.C3= 000010 G    1978# 2048  2063  2066  2084  2087  2090  2093  2096  2099  2102  2105  2108
                    2111  2834
```

```
CMD.C4= 000020 G  1976#
CMD2M   030345    5463   5515#
CMD3M   030420    5467   5525#
CMD4M   030426    5471   5526#
CMD5M   030434    5475   5527#
CMD6M   030442    5481   5528#
CMD7M   030450    5485   5529#
CMD8M   030456    5489   5530#
CMPDAT  003410 G  2263#  3769*  3777*  3863*  3866*  3867   3870*  3873*
CNTBGN= 002560    2228#  2251   3673
CNTEND= 003330    2248#  2251
CNTLEN= 000550 G  2251#  4240
CODELM  004056 G  2470#  4594
COUNTE= 050416    4321#  4327   4339
CP.ADH= 000004 G  2023#
CP.ADL= 000002 G  2022#  2844*  2854*  2862*  2870*  3624*  3649*  3798*  5360*
CP.CMD= 000000 G  2021#
CP.CNT= 000006 G  2024#  2679*  2829*  2855*  2861*  3361   3650*  3896   4684*  4687*  4689*  4693*  4696*
                  4698*
CRLF    005277 G  2499#  4170
CRLFSP  005302 G  2500#  4156   4164
CTCC    003460 G  2284#  2551   3143*  3161   3200   3212
CVC.C = 040000 G  1959#  2043   2114
C$AU  = 000052    1728#  4551
C$AUTO= 000061    1728#  4420
C$BRK = 000022    1728#  3069   3125   4313   4336
C$BSEG= 000004    1728#
C$BSUB= 000002    1728#  4583   4600   4608   4615   4622   4629   4636   4643   4650   4657   4664   4680
C$CEFG= 000045    1728#
C$CLCK= 000062    1728#
C$CLEA= 000012    1728#  4474
C$CLOS= 000035    1728#
C$CLP1= 000006    1728#
C$CVEC= 000036    1728#  4395   4456
C$DCLN= 000044    1728#  3957   4314   4353
C$DODU= 000051    1728#  4016   4401
C$DRPT= 000024    1728#  2752   4010
C$DU  = 000053    1728#  4508
C$EDIT= 000003    1728#  1775
C$ERDF= 000055    1728#  3005   3030   3049   3087   3271   3322   3461   3476   3508   3518   4002
C$ERHR= 000056    1728#  3223   3255   3303   3526   3891   3895   3921
C$ERRO= 000060    1728#
C$ERSF= 000054    1728#  4232
C$ERSO= 000057    1728#  3351   3400   3430
C$ESCA= 000010    1728#
C$ESEG= 000005    1728#
C$ESUB= 000003    1728#  4598   4606   4613   4620   4627   4634   4641   4648   4655   4662   4672   4701
C$ETST= 000001    1728#  4908   5051   5150   5193   5230   5366
C$EXIT= 000032    1728#  4362   4460   4706   4961   5147   5189   5226   5326
C$GETB= 000026    1728#
C$GETW= 000027    1728#
C$GMAN= 000043    1728#  4059
C$GPHR= 000042    1728#  4292   4529
C$GPLO= 000030    1728#
C$GPRI= 000040    1728#
C$INIT= 000011    1728#  4378
```

```
C$INLP= 000020          1728#
C$MANI= 000050          1728#   4052
C$MEM = 000031          1728#   4349
C$MSG = 000023          1728#   2538    2572
C$OPEN= 000034          1728#
C$PNTB= 000014          1728#   2524    2525    2534    2541    2542    2548    3376    3572    3592    3702    3892    3896
                        3936
C$PNTF= 000017          1728#   4311    4329    4332    4352    4398    4408    4413    4493    4594    5068
C$PNTS= 000016          1728#   4128    4129    4130    4131    4132    4133    4137    4148    4151    4156    4160    4164
                        4170
C$PNTX= 000015          1728#   2550    2551    2552    2553    3485    3496    3747    3753    3928    4037    4038
C$QIO = 000377          1728#
C$RDBU= 000007          1728#
C$REFG= 000047          1728#   4250    4265    4273    4276
C$RESE= 000033          1728#
C$REVI= 000003          1728#   1775
C$RFLA= 000021          1728#   4270
C$RPT = 000025          1728#   4201
C$SEFG= 000046          1728#
C$SPRI= 000041          1728#   4317
C$SVEC= 000037          1728#   4297    4393    4533
C$TPRI= 000013          1728#
DATARD  003420 G        2267#   2607    2622    2844    3798    3845    3846    3902    4350*   5360
DATAWT  003416 G        2266#   2287    2870    2899    3038*   3085*   3181*   3437*   3649    3901    4349*   4350    4351
                        4674    4675
DATCNT= 004000 G        1864    1868    1872    1880    1884    2033#   2353    2357    2361    4350    4351    4754    4758
                        4762    4766    4770    4774    4778    4788    4850    4854    4860    4864    4868    4874    4878
                        4882    4919    4927    4995    5001    5041    5163    5211    5219    5464    5468    5472    5476
                        5482    5486    5490
DATRAT  003412 G        2264#   3859*   3861    3862*   3867
DEVTBL  002536 G        2212#   2524    2541    2687    2722    2755    3013    3063    3195    3345    3369    3406    3548
                        3556    3564    3644    3654    3776    3806    3828    3953    3956    3959    3976    3977    4014
                        4017    4127    4128    4256*   4262*   4289    4320    4329    4332    4391    4399    4408    4413
                        4454    4492*   4528*   4589    4594    5089    5109    5114    5130    5294
DFPTBL  002176 G        1818#
DFTSCH= 000040 G        1988#   2637
DIA   = 100006 G        2116#   2402
DIABLK= 003416 G        2287#   2862
DIACNT= 000020 G        2032#   2861
DIAGMC= 000000          1728
DINT    002212 G        1851#   3026    3076
DINTM   030206          5457    5510#
DLY   = 000020 G        2120#   2404
DLY.C = 000020 G        1977#   2120    5275
DOAGIN  003340 G        2256#   5072*   5131*
DRI   = 100013 G        2048#   2377    4729
DROPDM  004702 G        2490#   4493
DROPED  003530 G        2316#   3701    3850    3853    3951*   3972*   4007*   4025*
DROPN   017136          4014*   4029#   4399*   4493
DROPU   016716 G        3006    3031    3050    3088    3324    3380    3463    3478    3510    3520    3989#
DROPUA  017046          4011#   4409    4414
DRORTN  017124          4025#
DTAERM  005474 G        2518#   3891    3895    3921
DTAER2  004763 G        2492#   3928
DTAER3  005032 G        2493#   3936
DTAER4  005074 G        2494#   3892
```

```
DTAER5  005115 G    2495#  3896
EF.CON= 000036 G    1920#
EF.NEW= 000035 G    1920#  4273
EF.PWR= 000034 G    1920#  4265
EF.RES= 000037 G    1920#  4276
EF.STA= 000040 G    1920#  4250
EINC    015156      3694   3715#
END   = 177777 G    2122#  2216  2271  2272  2273  2369  2370  2371  2372  2373  2405  2665  2687
                    2722   2755  3013  3806  3956  4078  4127  4289  4320  4391  4454  4589  4715
                    4718   4745  4751  4781  4803  4821  4843  4857  4871  4885  4895  4905  4937
                    4952   4958  5078  5089  5099  5123  5172  5186  5214  5222  5260  5294
ENDERF= 003500      2303#  3089  3097
ENDFLG= 003536      2324#  4358
ENDSP   030022      5480   5493#
ENDSP1  027630      5461   5480#
ENDSP2  027632      5479   5481#
EOTFLG  003510 G    2308#  2689  2693  2724  2725  2734  2739  2757  2758  2767  3150* 3173  3808
                    3809   3818  3854  5296  5300
ERCVER  002207 G    1848#  3350  3399  3571  3591  3701
ERLOG   003474 G    2298#  3668  3669*
ERRREC  003477 G    2301#  3036  3201  3297  3350  3355* 3410* 3435*
ERS   = 100411 G    2105#  2398  3632  4791
ERSFLG  003534 G    2320#  3584* 3630  3639* 5116*
EVL   = 000004 G    1920#
EXALL   006760 G    2664#  4587  4604  4612  4619  4626  4633  4640  4647  4654  4661  4668  4670
                    4938   4953  4959  5079  5173  5187  5215  5223
EXARTN  007252      2701   2710#
EXCRTN  011164      3007   3032  3052#
EXCUTE  010576 G    2727   2730  2741  2744  3000# 3412  3439  3627  3636  3653  3849  4082  5107
EXPBOT  003522 G    2310#  3283  4581* 4918* 5074* 5140* 5162* 5206* 5242*
EXSUB   007254 G    2683   2721# 5287  5352  5362
E$END = 002100      1728#
E$LOAD= 000035      1728#  1775
FATSM   004457 G    2483#  3476
FIRSTU  016614 G    2686   2721  2754  3012  3805  3951# 4126  4287  4319  4390  4453  4588  5081
                    5293
FMT.C0= 000040 G    1972#  2043
FMT.C1= 000100 G    1969#  2043
FTLCNT  003320 G    2247#  3990* 4137  4397* 4407* 4412*
FUNRM   004437 G    2482#  3322
F$AU  = 000015      1728#  4519  4551
F$AUTO= 000020      1728#  4388  4420
F$BGN = 000040      1728#  1758  1888  1913  2518  2535  2540  2554  2582  2586  2590  2594  4087
                    4111   4118  4141  4207  4220  4362  4388  4444  4460  4484  4494  4519  4536
                    4553   4576  4578  4583  4598  4600  4606  4608  4613  4615  4620  4622  4627
                    4629   4634  4636  4641  4643  4648  4650  4655  4657  4662  4664  4672  4680
                    4701   4706  4908  4915  4961  5051  5066  5147  5150  5159  5189  5193  5203
                    5226   5230  5239  5326  5366  5367  5392  5403  5413  5441  5522  5543  5551
                    5552   5555  5556
F$CLEA= 000007      1728#  4444  4474
F$DU  = 000016      1728#  4484  4508
F$END = 000041      1728#  1758  1888  1913  2535  2538  2554  2572  2584  2588  2592  2596  4087
                    4111   4141  4201  4362  4378  4420  4460  4474  4494  4508  4536  4551  4553
                    4576   4578  4583  4598  4600  4606  4608  4613  4615  4620  4622  4627  4629
                    4634   4636  4641  4643  4648  4650  4655  4657  4662  4664  4672  4680  4701
                    4706   4908  4915  4961  5051  5066  5147  5150  5159  5189  5193  5203  5226
```

```
                    5230  5239  5326  5366  5367  5392  5413  5427  5522  5532  5543  5551  5552
                    5555  5556
F$HARD= 000004      1728# 5403  5413  5427  5455  5461  5479  5480  5494  5522
F$HW  = 000013      1728# 1818  1829
F$INIT= 000006      1728# 4220  4378
F$JMP = 000050      1728# 2535  2554  4141  4362  4460  4494  4536  4706  4961  5147  5189  5226
                    5326  5413  5522
F$MOD = 000000      1728# 1758  1888  1913  4087  4111  4553  4576  5367  5392  5543
F$MSG = 000011      1728# 2518  2538  2540  2572
F$PROT= 000021      1728# 4207  4211
F$PWR = 000017      1728#
F$RPT = 000012      1728# 4118  4201
F$SEG = 000003      1728#
F$SOFT= 000005      1728# 5441  5455  5461  5479  5480  5494  5522  5532
F$SRV = 000010      1728# 2582  2584  2586  2588  2590  2592  2594  2596
F$SUB = 000002      1728# 4583  4598  4600  4606  4608  4613  4615  4620  4622  4627  4629  4634
                    4636  4641  4643  4648  4650  4655  4657  4662  4664  4672  4680  4701
F$SW  = 000014      1728# 1838  1887
F$TEST= 000001      1728# 4578  4908  4915  5051  5066  5150  5159  5193  5203  5230  5239  5366
GCMDA   007670 G    2789  2794  2810# 4055
GENPAT  010300 G    2871  2895#
GES   = 100017 G    2102# 2142  2397  4737  5288
GETSTM  005243 G    2498# 4037
GIT     010572      2982  2987#
GOWAIT  011166 G    2760  2763  2769  2772  3063# 3413  3440  3628  3637  3655  3851  4083  5108
GSCPK   002324 G    2142# 3998  4323  4403
GSCNTO= 000200      1728#
GSDELM= 000372      1728# 3042  3071  3074  4233  4312  4324  4335  5279
GSDISP= 000003      1728#
GSEXCP= 000400      1728#
GSHILI= 000002      1728#
GSLOLI= 000001      1728#
GSNO  = 000000      1728#
GSOFFS= 000400      1728# 4059  5410  5411  5450  5451  5452  5453  5454  5456  5457  5458  5459
                    5460  5462  5463  5464  5465  5466  5467  5468  5469  5470  5471  5472  5473
                    5474  5475  5476  5477  5478  5481  5482  5483  5484  5485  5486  5487  5488
                    5489  5490  5491  5492
GSOFSI= 000376      1728# 4059  5410  5411  5450  5451  5452  5453  5454  5456  5457  5458  5459
                    5460  5462  5463  5464  5465  5466  5467  5468  5469  5470  5471  5472  5473
                    5474  5475  5476  5477  5478  5481  5482  5483  5484  5485  5486  5487  5488
                    5489  5490  5491  5492
GSPRMA= 000001      1728# 5410
GSPRMD= 000002      1728# 5411  5462  5463  5464  5465  5466  5467  5468  5469  5470  5471  5472
                    5473  5474  5475  5476  5477  5478  5481  5482  5483  5484  5485  5486  5487
                    5488  5489  5490  5491  5492
GSPRML= 000000      1728# 4059  5450  5451  5452  5453  5454  5456  5457  5458  5459  5460
GSRADA= 000140      1728#
GSRADB= 000000      1728#
GSRADD= 000040      1728# 5463  5464  5465  5466  5467  5468  5469  5470  5471  5472  5473  5474
                    5475  5476  5477  5478  5481  5482  5483  5484  5485  5486  5487  5488  5489
                    5490  5491  5492
GSRADL= 000120      1728# 4059  5450  5451  5452  5453  5454  5456  5457  5458  5459  5460
GSRADO= 000020      1728# 5410  5411  5462
GSXFER= 000004      1728# 5413  5455  5461  5479  5480  5494  5522
GSYES = 000010      1728# 4059  5410  5411  5450  5451  5452  5453  5454  5456  5457  5458  5459
                    5460  5462  5463  5464  5465  5466  5467  5468  5469  5470  5471  5472  5473
```

```
                    5474  5475  5476  5477  5478  5481  5482  5483  5484  5485  5486  5487  5488
                    5489  5490  5491  5492
HAE      002206 G   1847#  4050
HAEM     030072     5452  5506#
HALTM    004126 G   2472#  4056*  4057*  4058*  4059
HELP   = 000000     1716#  1723  1750  1767  1777  1793  1820  1839  1922  2458  2519  4120  4173
                    4222  4363  4446  4461  4486  4495  4521  4537  5405  5415  5443  5497
HERE     003341 G   2257#  4254*  5067  5069*
HOE    = 100000 G   1920#
HRDCNT   003310 G   2246#  3222*  3254*  3302*  3920*  4137
IBE    = 010000 G   1920#
IDU    = 000040 G   1920#
IER    = 020000 G   1920#
IE.C   = 000200 G   1968#  2043  3035
INIT10   021222     4231#  4234
INIT15   021442     4251  4265#
INIT16   021462     4266  4270#
INTFLG   003500 G   2307#  2583*  2587*  2591*  2595*  3028  3034*  3077  4534*
INTPRI= 000340 G    1775  2028#  4297  4533
IRE      003527 G   2315#  3221  3296  5243*
IREC     002210 G   1849#  3354  3405  3434  3700  4018  4318
IRECM    030140     5454  5508#
IREM     030231     5458  5511#
ISR    = 000100 G   1920#
IXE    = 004000 G   1920#
I$AU   = 000041     1728#  4519#  4551#
I$AUTO= 000041      1728#  4388#  4420#
I$CLN  = 000041     1728#  4444#  4460  4474#
I$DU   = 000041     1728#  4484#  4508#
I$HRD  = 000041     5403#  5427#
I$INIT= 000041      1728#  4220#  4362  4378#
I$MOD  = 000041     1728#  1758#  1888#  1913#  4087#  4111#  4553#  4576#  5367#  5392#  5543#
I$MSG  = 000041     1728#  2518#  2538#  2540#  2572#
I$PROT= 000040      1728#  4207#
I$PTAB= 000041      1728#  5552#  5555#
I$PWR  = 000041     1728#
I$RPT  = 000041     1728#  4118#  4201#
I$SEG  = 000041     1728#  4578  4583  4600  4608  4615  4622  4629  4636  4643  4650  4657  4664
                    4680  4915  5066  5159  5203  5239
I$SETU= 000041      1728#  5551#  5552  5556#
I$SFT  = 000041     5441#  5532#
I$SRV  = 000041     1728#  2582#  2584#  2586#  2588#  2590#  2592#  2594#  2596#
I$SUB  = 000041     1728#  4578  4583#  4598#  4600#  4606#  4608#  4613#  4615#  4620#  4622#  4627#  4629#
                    4634#  4636#  4641#  4643#  4648#  4650#  4655#  4657#  4662#  4664#  4672#  4680#  4701#
                    4915  5066  5159  5203  5239
I$TST  = 000041     1728#  4578#  4583  4600  4608  4615  4622  4629  4636  4643  4650  4657  4664
                    4680  4706  4908#  4915#  4961  5051#  5066#  5147  5150#  5159#  5189  5193#  5203#
                    5226  5230#  5239#  5326  5366#
JLOC     003454 G   2281#  5264*  5271*
JLOOP    003452 G   2280#  5254*  5265  5269*
JMP    = 000040 G   2118#  2403
JMPMSG   030416     5494  5521#
JMP.C  = 000040 G   1973#  2118  5261
J$JMP  = 000167     1728#  2535  2554  4141  4494  4536
LENMSK   003440 G   2275#  2675  4920*  5164*
LOE    = 040000 G   1920#
```

```
LOG     014664 G        3096    3668#   4008
LOT   = 000010 G        1920#
L$ACP   002110 G        1775#
L$APT   002036 G        1775#
L$AU    023246 G        1775    4519#
L$AUT   002070 G        1775#
L$AUTO  022516 G        1775    4388#
L$CCP   002106 G        1775#
L$CLEA  023140 G        1775    4444#
L$CO    002032 G        1775#
L$DEPO  002011 G        1775#
L$DESC  002140 G        1775    1806#
L$DESP  002076 G        1775#
L$DEVP  002060 G        1775#
L$DISP  002124 G        1775    1791#
L$DLY   002116 G        1775#   3042    3071    3074    4233    4312    4324    4335    5279
L$DTP   002040 G        1775#
L$DTYP  002034 G        1775#
L$DU    023202 G        1775    4484#
L$DUT   002072 G        1775#
L$DVTY  002166 G        1775    1807#
L$EF    002052 G        1775#
L$ENVI  002044 G        1775#
L$ETP   002102 G        1775#
L$EXP1  002046 G        1775#
L$EXP4  002064 G        1775#
L$EXP5  002066 G        1775#
L$HARD  027202 G        1775    5403#
L$HIME  002120 G        1775#
L$HPCP  002016 G        1775#
L$HPTP  002022 G        1775#
L$HW    002176 G        1775    1818#
L$ICP   002104 G        1775#
L$INIT  021222 G        1775    4220#
L$LADP  002026 G        1775#
L$LAST  030670 G        1775    5542#   5556
L$LOAD  002100 G        1775#
L$LUN   002074 G        1775#   3959*   3977*
L$MREV  002050 G        1775#
L$NAME  002000 G        1775#
L$PRIO  002042 G        1775#
L$PROT  021214 G        1775    4207#
L$PRT   002112 G        1775#
L$REPP  002062 G        1775#
L$REV   002010 G        1775#
L$RPT   017366 G        1775    4118#
L$SOFT  027254 G        1775    5441#
L$SPC   002056 G        1775#
L$SPCP  002020 G        1775#
L$SPTP  002024 G        1775#
L$STA   002030 G        1775#
L$SW    002204 G        1775    1838#
L$TEST  002114 G        1775#   3040    3287    3855
L$TIML  002014 G        1775#
L$UNIT  002012 G        1775#   4259
L10000  002202          1818    1829#
```

```
L10001  002312          1838    1887#
L10002  005640          2535    2538#
L10003  006564          2554    2572#
L10004  006572          2584#
L10005  006600          2588#
L10006  006606          2592#
L10007  006614          2596#
L10010  021212          4141    4201#
L10012  022514          4362    4378#
L10013  023004          4420#
L10014  023200          4460    4474#
L10015  023244          4494    4508#
L10016  023340          4536    4551#
L10017  024726          4706    4908#
L10020  023474          4598#
L10021  023520          4606#
L10022  023540          4613#
L10023  023560          4620#
L10024  023600          4627#
L10025  023620          4634#
L10026  023640          4641#
L10027  023660          4648#
L10030  023700          4655#
L10031  023720          4662#
L10032  023756          4672#
L10033  024142          4701#
L10034  025402          4961    5051#
L10035  026040          5147    5150#
L10036  026204          5189    5193#
L10037  026336          5226    5230#
L10040  027176          5326    5366#
L10041  027252          5403    5413    5427#
L10042  030464          5441    5522    5532#
L10043  030674          5552#
L10045  030700          5552    5555#
MBR     = 100012 G      2087#   2148    2392
MEMOM   022412          4352    4374#
MISCFG  003541 G        2331#   3385*   4051    4061*
MOD.C0= 000400 G        1967#   2043    2054    2066    2069    2072    2099    2105    2108    2606    2688    2723    2756
                        2845    3167    3168    3172    3807    5295
MOD.C1= 001000 G        1966#   2043    2069    2072    2075    2078    2081    2093    2096    2099    2111    3404
MOD.C2= 002000 G        1965#   2043    2084
MOD.C3= 004000 G        1962#   2043
MOVMSG  011552 G        3004    3048    3086    3092    3141#   4000    4341
MSGCNT= 000016 G        2031#   2177    3022    3146    3994
MSGPKA  002506 G        2189#   3018    3020    3144    3992    4590
MSGPKT  002340 G        2158#   2551    2553    2607    3147*   3150    3161    3206    3218    3283    3292    3675    3676
                        3889    3991    4038
MSGPK0  002356 G        2168#   2175    2189
MSGPK1  002374 G        2169#   2190
MSGPK2  002412 G        2170#   2191
MSGPK3  002430 G        2171#   2192
MS.RFC= 000004 G        1993#   2551    2607    3218    3675    3676    3889
MS.XS0= 000006 G        1994#   2553    3150    3283    3292    4038
MS.XS1= 000010 G        1995#   2553    4038
MS.XS2= 000012 G        1996#   2553    3161    3206    4038
```

```
MS.XS3= 000014 G  1997# 2553 3991 4038
NCMD.C= 177740 G  2043# 2832
NCNT    003422 G  2268# 2667 2703* 2865* 3041 3799* 3800 3829* 3831* 3858 5104 5110* 5112*
                  5133* 5138* 5285 5308 5316*
NCNT1   003424 G  2269# 2667 2864* 3800 3829 5104 5110 5285 5308*
NEXTSP  027322    5455 5457#
NEXTU   016662 G  2698 2748 2776 3015 3825 3972# 4138 4307 4345 4417 4457 4596 5141
                  5305
NINUSE= 177774 G  2042# 2212 2213 2214 2215 3063 3195 3345 3369 3406 3548 3556 3564
                  3644 3654 3776 3828 3953 3976 4017 4256 4492 5109 5114 5130
NOINTM  004505 G  2484# 3087
NRDYM   023102    4332 4413 4424#
NSSRM   004355 G  2479# 3005
NUMBM   030365    5465 5469 5473 5477 5483 5487 5491 5517#
NURTY1  005157 G  2496# 3702
OFLINM  005213 G  2497# 4329 4408
ONEFIL= 000001    1712# 1754 1889 1890 1897# 1904 4095# 4102 4555 4564# 5368 5369 5377#
                  5383
OPFLAG  003542 G  2337# 4270* 4318
OPP.C = 020000 G  1960# 2043 2072 2078 3396
O$APTS= 000000    1728# 1775
O$AU  = 000001    1728# 1765# 1775
O$BGNR= 000001    1728# 1765# 1775
O$BGNS= 000001    1728# 1765# 1775
O$DU  = 000001    1728# 1765# 1775
O$ERRT= 000000    1728# 1775
O$GNSW= 000001    1728# 1765# 1775
O$POIN= 000001    1728# 1765# 1775
O$SETU= 000001    1728# 1765# 1775 5542
PASCNT  003260 G  2243# 2524 2541 4011 4012* 4128 4300* 4302* 4593
PATCH   030464 G  5538#
PATERN  003456 G  2282# 2866* 2895
PATR0   010364 G  2906 2919#
PATR1   010422 G  2907 2932#
PATR2   010442 G  2908 2942#
PATR3   010452 G  2909 2948#
PATR4   010476 G  2910 2959#
PATR5   010510 G  2911 2966#
PATR6   010522 G  2912 2972#
PATR7   010542 G  2913 2981# 2986
PATR8   010574 G  2914 2991#
PATTBL  010342    2900 2906#
PATTM   030405    5466 5470 5474 5478 5484 5488 5492 5518#
PCMDWD  003434 G  2273# 2704* 2793 2879* 3168 3172 3288 3386* 3620* 3631* 3645* 3772* 3779*
                  3832* 5317* 5355*
PIRE    002213 G  1852# 5243
PNT   = 001000 G  1920#
PRI   = 002000 G  1920#
PRI00 = 000000 G  1920# 4317
PRI01 = 000040 G  1920#
PRI02 = 000100 G  1920#
PRI03 = 000140 G  1920#
PRI04 = 000200 G  1920#
PRI05 = 000240 G  1920#
PRI06 = 000300 G  1920#
PRI07 = 000340 G  1920# 2028 4393
```

```
PRXST   017140 G  4004  4037#  5289
PTCMDS  027050    5247  5248   5249  5250  5251  5252  5253  5337#
PWRFLG  003537 G  2329#  4268*  4272  4348  4360*
RAMDAT  003346 G  2261#  3731   3748
RAMDUM  013360 G  3224  3256   3272  3304  3323  3352  3379  3401  3431  3462  3477  3484#  3509
                  3519
RAMER   015164 G  3488  3490   3492  3495  3726#
RAMFHR  005310    2501#  3485
RAMHLD  003342    2259#  3487*  3489*  3491*  3494*  3732  3744
RAMIOP  005401    2502#  3747
RAMLIN  005464    2504#  3496
RAMM    030262    5459  5512#
RAMPD   005452    2503#  3753
RAMR5H  003344    2260#
RAMSIZ  003406 G  2262#  3486*  3493*  3733  3743  3749
RAMWRT  002214 G  1853#  3484
RANB    003442 G  2276#  2672*  2673  2983*  2984  4247*  4933  4996*  4997  5043*  5044
RANBC = 153624 G  2040#  4247
RANCMD  025210    4935  4967#
RANDOM  003523 G  2311#  2669   3219  3294  4580*  4917*  5073*  5161*  5205*  5241*
RANP  = 000007 G  1862  1866   1870  1874  1878  1882  1886  2037#  2351  2355  2359  2363  2367
                  4930  4999   5003  5046  5213  5221
RANRD   025250    4949  4975   4976  4977  4978  4979  4980  4981  4982  4994#
RANS    003444 G  2277#  2672   2673*  2674  2983  2984*  2985  4248*  4933*  4934  4996  5043
RANSC = 032561 G  2041#  4248
RANW    025350    5013  5027   5041#
RANWR   025324    4968  4969   4970  4971  4972  4973  4974  5012#  5170
RANWV   025336    4967  5026#
RCVERM  030116    5453  5507#
RDF   = 104001 G  2051#  2360   2378  3780  4691  4873  5000  5210
RDR   = 104401 G  2054#  2356   2379  3773  4682  4859  4994  5218  5356
RECCNT  003330 G  2249#  2524   2541  3037*  3038  3085  3160*  3164*  3169*  3174*  3181  3378*  3381*
                  3436*  3437   3581  4128  4306*
RECLOG  003473 G  2297#  3159   3162*  4006
RECRED  006562    2526*  2530   2531*  2534  2547*  2548  2570#
RECTAP  006616 G  2529  2546   2606#
RECUD   011636 G  3093  3159#
REPEAT= 050232    3551#  3562
RERM    004634 G  2488#  3351   3400  3430
RETRY = 050230    3549#  3569   3589
RETRYC  003466 G  2293#  3366*  3395  3399  3403*  3429  3433*  3516  3524  3563*  3572  3574  3588
                  3702
REWRT   014550    3555  3644#
RFBC    002660 G  2231#  4131
RFCERM  004340 G  2478#  3223
RFREC   002760 G  2236#  4132
RFUNR   002770 G  2237#  4133
RLEXM   004374 G  2480#  3518   3526
RNF   = 125401 G  2072#  2387   4867
RNOPSC= 177740 G  2036#  4928   4950  4997  5044
RNR   = 105401 G  2069#  2386   4863
RNYM    004570 G  2487#  4002
RPF   = 105001 G  2075#  2388   4877
RPR   = 125001 G  2078#  2389   4881
RPTCNT  003470 G  2294#  3367*  3557*  3560*  3561  3572  3586*
RPTFLG  003525 G  2313#  2750   2751*  4955*
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PARAMETER CODING MACY11 30(1046) 12-JUL-83 09:44 PAGE 80-11
CZTUVB.P11 12-JUL-83 09:26 CROSS REFERENCE TABLE -- USER SYMBOLS SEQ 0183

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RPT1A   020230          4128    4185#
RPT1B   020305          4129    4186#
RPT1C   020356          4130    4187#
RPT1D   020427          4131    4188#
RPT1E   020655          4148    4192#
RPT1F   020533          4132    4190#
RPT1G   020604          4133    4191#
RPT1I   021001          4137    4195#
RPT1J   020705          4151    4193#
RPT1K   020772          4160    4194#
RRANV   002205 G        1846#   4246
RRBC    002620 G        2230#   4130
RRECL = 000020 G        2038#   3394    3524
RRREC   002740 G        2234#   4132
RRUNR   002750 G        2235#   4133
RRVM    030043          5451    5505#
RTLE    013512 G        3392    3428    3507#
RTLRTN  013646          3512    3530#
RWCPK   002334 G        2153#   3382    3459
RWD   = 102010 G        2084#   2153    2348    2364    2391    2651    3070    3163    4747    4823    4845    4891
RWERR   003475 G        2299#   3230    3362*   3514*   3585*   3693
R5SAVE  003462 G        2285#   3011*   3017    3989*   4026    4125*   4140    5127*   5129
SCCNT   003270 G        2244#   3202*   3300*   4137
SCERM   004314 G        2477#   3255
SCH   = 140004 G        2114#   2344    2401    2636    3010    4725    4733    4741
SCHBK   002446 G        2175#   2854    2856*   3018*
SCHCNT= 000010 G        2029#   2855
SEQEND  003634 G        2369#   4932    5169
SETCH   006714 G        2635#   4921    5075    5165    5207    5244
SETRW   006740 G        2651#   4923    4957    5076    5166    5185    5208
SETUP   007722 G        2666    2827#   4080    5102    5125    5284
SFF   = 105010 G        2096#   2395    3073    4809    4817
SFPTBL  002204 G        1838#
SFR   = 105410 G        2099#   2396    3073    4805    4813
SRF   = 104010 G        2063#   2384    4827    4835
SRR   = 104410 G        2066#   2385    3288    3621    4831    4839
STAERM  005642 G        2540#   3005    3030    3049    3087    3223    3255    3271    3303    3322    3351    3400    3430
                        3461    3476    3508    3518    3526    4002
STAER1  006154          2524    2541    2557#   2790*   2791*   2792*
STAER2  006332          2550    2561#
STAER3  006411          2551    2562#
STAER4  006447          2552    2563#
STAER5  006467          2553    2566#   4038
STAER6  006276          2534    2548    2560#
STAER7  006246          2525    2542    2559#   2796*   2797*   2798*
STAFLG  003536 G        2328#   4022*   4252*   4267*   4275    4605*   4922    4924*   5077*   5167*   5209*   5255*
STREAM  003533 G        2319#   3802    3823    5093*   5145*
STTIM   003414 G        2265#   3770*   3778*   3868    3872*
SVCGBL= 000000          1728#   1742#   1775    1791    1806    1807    1818    1838    2518    2540    2582    2586    2590
                        2594    4118    4207    4220    4388    4444    4484    4519    5403    5441    5542#
SVCINS= 000001          1728#   1739#   1775    1791    1806    1807    1818    1838    2524    2525    2534    2535    2538
                        2541    2542    2548    2550    2551    2552    2553    2554    2572    2584    2588    2592    2596
                        2752    3005    3030    3042    3049    3069    3071    3074    3087    3125    3223    3255    3271
                        3303    3322    3351    3376    3400    3430    3461    3476    3485    3496    3508    3518    3526
                        3572    3592    3702    3747    3753    3891    3892    3895    3896    3921    3928    3936    3957
                        4002    4010    4016    4037    4038    4052    4053    4059    4128    4129    4130    4131    4132
```

```
                        4133  4137  4141  4148  4151  4156  4160  4164  4170  4201  4232  4233  4250
                        4251  4265  4266  4270  4273  4276  4292  4297  4311  4312  4313  4314  4317
                        4324  4329  4332  4335  4336  4349  4352  4353  4362  4378  4393  4395  4398
                        4401  4408  4413  4420  4456  4460  4474  4493  4494  4508  4529  4533  4536
                        4551  4583  4594  4598  4600  4606  4608  4613  4615  4620  4622  4627  4629
                        4634  4636  4641  4643  4648  4650  4655  4657  4662  4664  4672  4680  4701
                        4706  4908  4961  5051  5068  5147  5150  5189  5193  5226  5230  5279  5326
                        5366  5403  5410  5411  5413  5427  5441  5450  5451  5452  5453  5454  5455
                        5456  5457  5458  5459  5460  5461  5462  5463  5464  5465  5466  5467  5468
                        5469  5470  5471  5472  5473  5474  5475  5476  5477  5478  5479  5480  5481
                        5482  5483  5484  5485  5486  5487  5488  5489  5490  5491  5492  5494  5522
                        5532  5542  5552
SVCSUB= 000000           1728#  1741#  4583  4600  4608  4615  4622  4629  4636  4643  4650  4657  4664
                        4680
SVCTAG= 000000           1728#  1743#  1829  1887  2538  2572  2584  2588  2592  2596  4059  4201  4378
                        4420  4474  4508  4551  4598  4606  4613  4620  4627  4634  4641  4648  4655
                        4662  4672  4701  4908  5051  5150  5193  5230  5366  5427  5532  5552  5555
SVCTST= 000000           1728#  1740#  4578  4915  5066  5159  5203  5239
SWBFLG  003526 G         2314#  2613  2881  3794  3908  4669*  4671*  4686*  4695*
SWB.C = 010000 G         1961#  2043  2882  3795
S$LSYM= 010000           1728#  1829#  1887#  2538#  2572#  2584#  2588#  2592#  2596#  4059#  4201#  4378#  4420#
                        4474#  4508#  4551#  4598#  4606#  4613#  4620#  4627#  4634#  4641#  4648#  4655#  4662#
                        4672#  4701#  4908#  5051#  5150#  5193#  5230#  5366#  5427#  5532#
TAPCAP  021112           4197#  5068
TCCRA   012232           3215  3238#
TCC0    012252 G         3238  3254#
TCC1    012274 G         3239  3271#  4342
TCC2    012312 G         3240  3283#
TCC3    012460 G         3241  3322#
TCC4    012502 G         3242  3345#
TCC5    013200 G         3243  3428#
TCC6    013302 G         3244  3459#
TCC7    013336 G         3245  3476#
TC2RTN  012456           3285  3289  3308#
TIME1   003446 G         2278#  2527*  2532  3000*  3002*  3003  3067*  3082*  3083  3084  3123*  3126*  3127
                        3923*  3924*  3928  4059  4322*  4340
TIME2   003450 G         2279#  2528*  2533  3925*  3926*  3928  4334*  5278*  5280*
TOERM   004273 G         2476#  3049
TOOMM   004544 G         2486#  3030
TRAPD4  003540 G         2330#  4392*  4396  4431*
TRAP4   023132 G         4393  4431#
TSAM    004522 G         2485#  3303
TSBA  = 002456 G         2185#  3740
TSC.FC= 177717 G         1953#
TSC.TC= 177761 G         1954#  3142
TSDB    002456 G         2182#  2185  2551  3045*  3382*  3459*  3734  3998*  4295*  4323*  4403*  4531*
TSSR    002466 G         2183#  3009  3029  3047  3080  3127  3141  4294*  4325  4326  4394  4398  4405
                        4406  4530*
TSSREG  003464 G         2286#  2551  3029*  3141*  3142  3199  3205
TSVCT   002476 G         2184#  4296*  4297  4456  4532*  4533
TS.A16= 000400 G         1950#
TS.A17= 001000 G         1949#
TS.NBA= 002000 G         1948#
TS.NXM= 004000 G         1947#  3205
TS.OFL= 000100 G         1952#  4326  4406
TS.RMR= 010000 G         1946#
```

```
TS.SC = 100000 G    1943#  3199
TS.SPE= 020000 G    1945#
TS.SSR= 000200 G    1951#  3009  3047  3079  3127  4325  4405
TS.UPE= 040000 G    1944#  3205
TS4ADR  027226      5410   5422#
TS4CL   002526 G    2203#  4592*  4594
TS4INT  002516 G    2196#  4297   4533
TS4IN0  006566 G    2196   2582#
TS4IN1  006574 G    2197   2586#
TS4IN2  006602 G    2198   2590#
TS4IN3  006610 G    2199   2594#
TS4VCT  027243      5411   5423#
T$ARGC= 000001      1775#  2524#  2525#  2534#  2541#  2542#  2548#  2550#  2551#  2552#  2553#  3376#  3485#
                    3496#  3572#  3592#  3702#  3747#  3753#  3892#  3896#  3928#  3936#  4037#  4038#  4128#
                    4129#  4130#  4131#  4132#  4133#  4137#  4148#  4151#  4156#  4160#  4164#  4170#  4311#
                    4329#  4332#  4352#  4398#  4408#  4413#  4493#  4594#  5068#
T$CODE= 023004      4059#  5410#  5411#  5413#  5450#  5451#  5452#  5453#  5454#  5455#  5456#  5457#  5458#
                    5459#  5460#  5461#  5462#  5463#  5464#  5465#  5466#  5467#  5468#  5469#  5470#  5471#
                    5472#  5473#  5474#  5475#  5476#  5477#  5478#  5479#  5480#  5481#  5482#  5483#  5484#
                    5485#  5486#  5487#  5488#  5489#  5490#  5491#  5492#  5494#  5522#
T$ERRN= 000001      1728#  3005#  3030#  3049#  3087#  3223#  3255#  3271#  3303#  3322#  3351#  3400#  3430#
                    3461#  3476#  3508#  3518#  3526#  3891#  3895#  3921#  4002#  4232#
T$EXCP= 000000      5410#  5411#  5462#  5463#  5464#  5465#  5466#  5467#  5468#  5469#  5470#  5471#  5472#
                    5473#  5474#  5475#  5476#  5477#  5478#  5481#  5482#  5483#  5484#  5485#  5486#  5487#
                    5488#  5489#  5490#  5491#  5492#
T$FLAG= 000041      2535#  2554#  4141#  4362#  4460#  4494#  4536#  4706#  4961#  5147#  5189#  5226#  5326#
                    5413#  5522#
T$FREE= 030700      5542   5556#
T$GMAN= 000000      1728#
T$HILI= 000010      5410#  5411#  5462#  5463#  5464#  5465#  5466#  5467#  5468#  5469#  5470#  5471#  5472#
                    5473#  5474#  5475#  5476#  5477#  5478#  5481#  5482#  5483#  5484#  5485#  5486#  5487#
                    5488#  5489#  5490#  5491#  5492#
T$LAST= 000001      1728#  5542#  5551
T$LOLI= 000000      5410#  5411#  5462#  5463#  5464#  5465#  5466#  5467#  5468#  5469#  5470#  5471#  5472#
                    5473#  5474#  5475#  5476#  5477#  5478#  5481#  5482#  5483#  5484#  5485#  5486#  5487#
                    5488#  5489#  5490#  5491#  5492#
T$LSYM= 010000      1728#  1829   1887   2538   2572   2584   2588   2592   2596   4201   4378   4420   4474
                    4508   4551   4598   4606   4613   4620   4627   4634   4641   4648   4655   4662   4672
                    4701   4908   5051   5150   5193   5230   5366   5427   5532
T$LTNO= 000006      5542#
T$NEST= 177777      1728#  1758#  1818#  1829#  1838#  1887#  1888#  1913#  2518#  2538#  2540#  2572#  2582#
                    2584#  2586#  2588#  2590#  2592#  2594#  2596#  4087#  4111#  4118#  4201#  4207#  4211#
                    4220#  4378#  4388#  4420#  4444#  4474#  4484#  4508#  4519#  4551#  4553#  4576#  4578#
                    4583#  4598#  4600#  4606#  4608#  4613#  4615#  4620#  4622#  4627#  4629#  4634#  4636#
                    4641#  4643#  4648#  4650#  4655#  4657#  4662#  4664#  4672#  4680#  4701#  4908#  4915#
                    5051#  5066#  5150#  5159#  5193#  5203#  5230#  5239#  5366#  5367#  5392#  5403#  5413
                    5427#  5441#  5455   5461   5479   5480   5494   5522   5532#  5543#
T$NS0 = 000000      1758#  1888   1913#  4087   4111#  4553   4576#  5367   5392#  5543
T$NS1 = 000005      1818#  1829   1838#  1887   2518#  2538   2540#  2572   2582#  2584   2586#  2588   2590#
                    2592   2594#  2596   4118#  4201   4207#  4211   4220#  4378   4388#  4420   4444#  4474
                    4484#  4508   4519#  4551   4578#  4908   4915#  5051   5066#  5150   5159#  5193   5203#
                    5230   5239#  5366   5403#  5413   5427   5441#  5455   5461   5479   5480   5494   5522
                    5532
T$NS2 = 000002      4583#  4598   4600#  4606   4608#  4613   4615#  4620   4622#  4627   4629#  4634   4636#
                    4641   4643#  4648   4650#  4655   4657#  4662   4664#  4672   4680#  4701
T$PCNT= 000000      5551#  5552#
```

```
T$PTAB= 010044          5552#
T$PTHV= 000001          1775    5556#
T$PTNU= 000001          1728#   5552#   5556
T$SAVL= 177777          1728#
T$SEGL= 177777          1728#
T$SIZE= 000004          5542    5556#
T$SUBN= 000000          1728#   4578#   4583#   4600#   4608#   4615#   4622#   4629#   4636#   4643#   4650#   4657#   4664#
                        4680#   4915#   5066#   5159#   5203#   5239#
T$TAGL= 177777          1728#
T$TAGN= 010046          1728#   1818#   1838#   2518#   2540#   2582#   2586#   2590#   2594#   4118#   4207#   4220#   4388#
                        4444#   4484#   4519#   4578#   4583#   4600#   4608#   4615#   4622#   4629#   4636#   4643#   4650#
                        4657#   4664#   4680#   4915#   5066#   5159#   5203#   5239#   5403#   5441#   5551#   5552#
T$TEMP= 000000          1791#   1829#   1887#   1888#   2535#   2538#   2554#   2572#   2584#   2588#   2592#   2596#   4059#
                        4087#   4141#   4201#   4211#   4362#   4378#   4420#   4460#   4474#   4494#   4508#   4536#   4551#
                        4553#   4598#   4606#   4613#   4620#   4627#   4634#   4641#   4648#   4655#   4662#   4672#   4701#
                        4706#   4908#   4961#   5051#   5147#   5150#   5189#   5193#   5226#   5230#   5326#   5366#   5367#
                        5410#   5411#   5413#   5427#   5450#   5451#   5452#   5453#   5454#   5456#   5457#   5458#   5459#
                        5460#   5462#   5463#   5464#   5465#   5466#   5467#   5468#   5469#   5470#   5471#   5472#   5473#
                        5474#   5475#   5476#   5477#   5478#   5481#   5482#   5483#   5484#   5485#   5486#   5487#   5488#
                        5489#   5490#   5491#   5492#   5522#   5532#   5543#
T$TEST= 000006          1728#   4578#   4583    4600    4608    4615    4622    4629    4636    4643    4650    4657    4664
                        4680    4915#   5066#   5159#   5203#   5239#   5542
T$TSTM= 177777          1728#   2524    2525    2534    2538    2541    2542    2548    2550    2551    2552    2553    2572
                        2752    3005    3030    3049    3069    3087    3125    3223    3255    3271    3303    3322    3351
                        3376    3400    3430    3461    3476    3485    3496    3508    3518    3526    3572    3592    3702
                        3747    3753    3891    3892    3895    3896    3921    3928    3936    3957    4002    4010    4016
                        4037    4038    4052    4059    4128    4129    4130    4131    4132    4133    4137    4148    4151
                        4156    4160    4164    4170    4201    4232    4250    4265    4270    4273    4276    4292    4297
                        4311    4313    4314    4317    4329    4332    4336    4349    4352    4353    4362    4378    4393
                        4395    4398    4401    4408    4413    4420    4456    4460    4474    4493    4508    4529    4533
                        4551    4583    4594    4598    4600    4606    4608    4613    4615    4620    4622    4627    4629
                        4634    4636    4641    4643    4648    4650    4655    4657    4662    4664    4672    4680    4701
                        4706    4908    4961    5051    5068    5147    5150    5189    5193    5226    5230    5326    5366
T$TSTS= 000001          1728#   4578#   4915#   5066#   5159#   5203#   5239#
T$$AU = 010016          4519#   4536    4551
T$$AUT= 010013          4388#   4420
T$$CLE= 010014          4444#   4460    4474
T$$DAT= 010045          5552#   5555
T$$DU = 010015          4484#   4494    4508
T$$HAR= 010041          5403#   5413    5427
T$$HW = 010000          1818#   1829
T$$INI= 010012          4220#   4362    4378
T$$MSG= 010003          2518#   2535    2538    2540#   2554    2572
T$$PC = 000001          5551#   5556
T$$PRO= 010011          4207#
T$$PTA= 010044          5551#   5552#
T$$RPT= 010010          4118#   4141    4201
T$$SOF= 010042          5441#   5522    5532
T$$SRV= 010007          2582#   2584    2586#   2588    2590#   2592    2594#   2596
T$$SUB= 010033          4583#   4598    4600#   4606    4608#   4613    4615#   4620    4622#   4627    4629#   4634    4636#
                        4641    4643#   4648    4650#   4655    4657#   4662    4664#   4672    4680#   4701
T$$SW = 010001          1838#   1887
T$$TES= 010040          4578#   4706    4908    4915#   4961    5051    5066#   5147    5150    5159#   5189    5193    5203#
                        5226    5230    5239#   5326    5366
T1      023342 G        1791    4578#
T1SWB   003531 G        2317#   3903    4678*   4703*
```

```
T1.1     023352          4583#
T1.10    023702          4657#
T1.11    023722          4664#
T1.12    024006          4680#
T1.2     023476          4600#
T1.3     023522          4608#
T1.4     023542          4615#
T1.5     023562          4622#
T1.6     023602          4629#
T1.7     023622          4636#
T1.8     023642          4643#
T1.9     023662          4650#
T2       024730 G        1791    4915#
T3       025404 G        1791    5066#
T4       026042 G        1791    5159#
T5       026206 G        1791    5203#
T5WEOT   027072          4945    5180    5311    5350#
T6       026340 G        1791    5239#
UAM   =  000200 G        1920#
UNL   =  100412 G        2108#   2399
UNREC    003476 G        2300#   3298*   3389*   3415*   3442*   3517*   3525*   3695
URERM    004656 G        2489#   3461    3508
VFEXC    015504 G        3775    3782    3793#   4683    4685    4688    4690    4692    4694    4697    4699
VFISU    015770 G        3811    3814    3820    3844#
VFYCNT   003300 G        2245#   3919*   4137
VFYDAT   015370 G        2706    3769#   5128    5319
VFYFLG   003524 G        2312#   2671    2874*   2877*   3219    3294    3771    5126*   5139*
VFY.C =  000100 G        1970#   2060    2873    2875
WLKZRO   010456          2949#   2954    2960
WRBC     002560 G        2229#   4129    4241*
WRECL =  000020 G        2039#   3516
WRITEM   017312 G        4072#   5115    5134
WRR   =  105005 G        2081#   2390    4853
WRREC    002720 G        2232#   3694    4132
WRT   =  104005 G        2057#   2352    2380    2670    3040    4787    4849    5012    5095    5119
WRTY     013650 G        3368    3548#
WRTYCT   003250 G        2242#   3365*   4148
WRTYER   003472 G        2296#   3356*   3373    3554*   3561    3568    3590
WRTYFG   003471 G        2295#   3095    3357    3363*   3384*
WRUNR    002730 G        2233#   4133
WSSR     011516 G        3014    3123#   3460    3737    3739    3999    4404    4455
WTM   =  100011 G        2090#   2393    2838    3288    4074    4783    4795
WTR   =  101011 G        2093#   2394    4799
WTV   =  104105 G        2060#   2381    4753    4757    4761    4765    4769    4773    4777    4897    4901    4926    5026
WTVERM   004250 G        2475#   3891    3895    3921
WTYBRF   014166          3361*   3605#   3650
WTYCMD   014162          3360*   3603#   3647
WTYWRD   014164          3359*   3386    3604#   3646
XSALWA=  000000          1728#   5413    5479    5480    5494    5522
XSFALS=  000040          1728#   5461
XSOFFS=  000400          1728#   5413    5455    5461    5479    5480    5494    5522
XSTRUE=  000020          1728#   5455
XO.BOT=  000002 G        2006#   2689    2724    2734    2757    3173    3283    3292    3808    3854    5296
XO.EOT=  000001 G        2007#   2693    2725    2739    2758    2767    3809    3818    5300
XO.LET=  020000 G        2003#   3292
XO.ONL=  000100 G        2005#
```

```
X0.RLL= 010000 G    2004#  3292
X0.RLS= 040000 G    2002#  3292
X0.TMK= 100000 G    2001#  3292
X2.OPM= 100000 G    2011#  3161  3206
X3.DCK= 000010 G    2015#
X3.RNY= 157400 C    2016#  4001
ZROPAT  010426      2933#  2936  2943  2967
$BGNLE= 177777      1730#
$BRJMP= 177777      5258#  5324#
$ERFLG= 000400      1730#  2526#  2527#  2528#  2530#  2531#  2532#  2533#  2543#  2544#  2547#  2583#  2587#
                    2591#  2595#  2607#  2609#  2610#  2611#  2612#  2614#  2616#  2617#  2619#  2622#  2635#
                    2651#  2652#  2653#  2664#  2672#  2673#  2674#  2675#  2677#  2679#  2685#  2690#  2695#
                    2703#  2704#  2709#  2736#  2737#  2751#  2788#  2793#  2796#  2797#  2798#  2810#  2812#
                    2814#  2815#  2827#  2839#  2846#  2848#  2854#  2856#  2864#  2865#  2872#  2874#  2877#
                    2879#  2880#  2882#  2885#  2895#  2896#  2897#  2898#  2899#  2919#  2920#  2922#  2923#
                    2925#  2933#  2949#  2973#  2981#  3000#  3002#  3011#  3017#  3018#  3020#  3021#  3023#
                    3024#  3029#  3034#  3037#  3038#  3067#  3077#  3079#  3080#  3082#  3085#  3089#  3097#
                    3109#  3111#  3123#  3126#  3141#  3142#  3143#  3144#  3145#  3147#  3148#  3150#  3160#
                    3162#  3164#  3169#  3174#  3181#  3207#  3209#  3212#  3214#  3222#  3231#  3254#  3298#
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PARAMETER CODING MACY11 30(1046) 12-JUL-83 09:44 PAGE 80-30
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```

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                    4260#  4263   4272#  4286   4289#  4308   4310#  4315   4318#  4347   4348#  4355   4391#
                    4418   4454#  4458   4589#  4597   4675#  4677   4715#  4717   4922#  4925   4931#  4940
                    5067#  5070   5089#  5143   5168#  5175   5260#  5322
$TSK1 = 050474      2608#  2618#  2620   2665#  2708   2722#  2749   2755#  2777   2811#  2813   3003#  3008
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                    3095#  3099   3146#  3149   3161#  3180   3200#  3204   3205#  3211#  3213   3217#  3228
                    3288#  3290   3294#  3306   3350#  3353   3354#  3388#  3390   3393#  3398   3399#  3402
                    3405#  3414#  3416   3516#  3522   3524#  3528   3550#  3588   3590#  3594   3654#  3657
                    3671#  3707   3776#  3783   3800#  3834   3846#  3848   3854#  3877   3894#  3897#  3938
                    3953#  3955   3994#  3997   4018#  4023   4051#  4060#  4062   4127#  4139   4153#  4155
                    4159#  4168   4240#  4243   4274#  4285   4289#  4308   4320#  4346   4351#  4354   4391#
                    4418   4454#  4458   4589#  4597   4675#  4677   4715#  4717   4932#  4936   5089#  5143
                    5169#  5171   5260#  5322
$TSK2 = 050475      2613#  2615   2667#  2705   2723#  2733#  2747   2756#  2766#  2775   3013#  3016   3163#
                    3165#  3179   3201#  3203   3206#  3208#  3210   3218#  3227   3296#  3305   3357#  3387
                    3395#  3397   3406#  3408#  3409   3552#  3561   3564#  3566#  3567   3568#  3570#  3587
                    3591#  3593   3675#  3677   3679#  3682   3684#  3687   3689#  3692   3693#  3706   3806#
                    3826   3828#  3830   3855#  3857#  3876   3903#  3905   3906#  3933   3935#  3937   4134#
                    4136   4163#  4167   4240#  4243   4275#  4282#  4284   4293#  4305   4320#  4346   4396#
```

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                    5318
$TSK3 = 050476      2667#  2705  2724#  2732  2734#  2738  2739#  2742#  2746  2757#  2765  2767#  2770#
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                    3558#  3559  3571#  3573  3574#  3583  3679#  3682  3684#  3687  3689#  3692  3695#
                    3698#  3705  3806#  3826  3858#  3860#  3865  3867#  3875  3907#  3914  3927#  3929
                    4277#  4279#  4281  4298#  4304  4322#  4338  4340#  4343  4405#  4411#  4415  5104#
                    5113   5130#  5136  5285#  5318
$TSK4 = 050511      2669#  2682  2687#  2699  2700#  2702  2725#  2729#  2731  2743#  2745  2758#  2762#
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                    3700#  3704  3807#  3817#  3822  3861#  3864  3868#  3871#  3874  3908#  3913  4299#
                    4301#  4303  4322#  4338  4406#  4410  5109#  5111  5288#  5290  5294#  5306  5307#
                    5313#  5315
$TSK5 = 050510      2670#  2681  2687#  2699  2726#  2728  2759#  2761  3168#  3170  3172#  3176  3701#
                    3703   3808#  3816  3818#  3821  3909#  3912  4325#  4331#  4333  4334#  4337  5294#
                    5306   5310#  5312
$TSK6 = 050504      2671#  2680  2688#  2692#  2697  3173#  3175  3809#  3813#  3815  4326#  4328#  4330
                    4334#  4337  5295#  5299#  5304
$TSK7 = 050506      2676#  2678  2689#  2691  2693#  2696  3810#  3812  5296#  5298  5300#  5303
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                    3296#  3297#  3345#  3349#  3350#  3354#  3357#  3369#  3375#  3393#  3395#  3399#  3405#
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$$CASE= 000000      1730#
$$DST = 000000      1730#
$$ELOC= 000402      1730#  2545#  2549#  2606#  2608#  2613#  2615#  2618  2620#  2621  2623#  2669#  2670#
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```

```
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                5114#  5130#  5136#  5137#  5288#  5290#  5295#  5296#  5298#  5299   5300#  5303#  5304#
                5307#  5310#  5312#  5313   5315#
$SERFL= 000000  1730#  3562#  3589#  4339#
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BGNDU   4484
BGNHRD  5403
BGNHW   1818
BGNINI  4220
BGNMOD  1758  1913  4111  4576  5392
BGNMSG  2518  2540
BGNPRO  4207
BGNPTA  5552
BGNRPT  4118
BGNSET  5551
BGNSFT  5441
BGNSRV  2582  2586  2590  2594
BGNSUB  4583  4600  4608  4615  4622  4629  4636  4643  4650  4657  4664  4680
BGNSW   1838
BGNTST  4578  4915  5066  5159  5203  5239
BNCOMP  4053  4251  4266
BREAK   3069  3125  4313  4336
CALL    1730#
CASE    1730#
CLRVEC  4395  4456
DEALLO  1730#
DECLAR  1730#
DECR    1730#
DECRU   1730#
DEFAUL  1730#
DELAY   3042  3071  3074  4233  4312  4324  4335  5279
.ESCRI  1806
DEVTYP  1807
DISPAT  1791
DOCLN   3957  4314  4353
DODU    4016  4401
DORPT   2752  4010
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ENDAUT  4420
ENDCLN  4474
ENDDEC  1730#
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ENDDU   4508
ENDHRD  5427
ENDHW   1829
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ERRSF   4232
ERRSOF  3351  3400  3430
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GPHARD  4292  4529
GPRMA   5410
GPRMD   5411  5462  5463  5464  5465  5466  5467  5468  5469  5470  5471  5472  5473  5474  5475
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LOOP    1730#
MANUAL  4052
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M$MCLO  1728#
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PUSH	1730#														
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RETURN	1730#														
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SVC	1727#	1728													
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UNTILB	1730#	3373	3561												
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	5169	5260	5285	5294											
WHILEB	1730#														
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XFERT	5455														
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